



**MARIN MUNICIPAL
WATER DISTRICT**



2010 Urban Water Management Plan
Marin Municipal Water District
June, 2011



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Abbreviations

ABAG	Association of Bay Area Governments	gpm	Gallons per minute
ac-ft	Acre-feet	gpcd	Gallons per capita per day
ac-ft/yr	Acre-feet per year	HET	High efficiency toilet
AMS	Advanced metering system	IND	Industrial
BMP	Best management practices	INS	Institutional
BTTP	Bon Tempe Treatment Plant	IWRMP	Integrated Water Resources Management Plan
°C	Degrees Celsius	MG	Million gallons
CAC	Conservation Advisory Committee	mgd	Million gallons per day
CAP	Conservation Assistance Program	mg/L	Milligrams per liter
ccf	Hundred cubic feet	MOU	Memorandum of understanding
CICS	Central Irrigation Controller System	NMWD	North Marin Water District
CII	Commercial Industrial Institutional	NRSF	New residential single family
CMSA	Central Marin Sanitation Agency	PG&E	Pacific Gas and Electric
COM	Business customer	RMF	Residential multi family
CPUC	California Public Utilities Commission	RSF	Residential single family
CUWCC	California Urban Water Conservation Council	SASM	Sewerage Agency of Southern Marin
District	Marin Municipal Water District	SAP	Systems application programming
DMM	Demand management measure	SCWA	Sonoma County Water Agency
DSS	Decision Support System	SFPUC	San Francisco Public Utilities Commission
DWR	California Department of Water Resources	TDS	Total dissolved solids
EBMUD	East Bay Municipal Utilities District	ULFT	Ultra low flow toilet
EIR	Environmental Impact Report	UWMP	Urban Water Management Plan
ET	Evapotranspiration	UWMP Act	Urban Water Management Planning Act
FFMP	Fire Flow Master Plan	WEL	Water Efficient Landscaper
		WWTP	Wastewater treatment plant
		VOMWD	Valley of the Moon Water District

1.0 Plan Preparation

The Urban Water Management Planning Act (UWMP Act) was created by Assembly Bill 797, which was signed into law in September 1983. Since then the UWMP Act has been amended by Assembly Bill 2661 (July 1990), Assembly Bill 1869 (October 1991), and Assembly Bill 11X (October 1991).

The UWMP Act requires that urban water suppliers (i.e. municipal water suppliers providing water for municipal purposes to more than 3,000 customers or supplying more than 3,000 acre-feet of water annually) prepare and adopt Urban Water Management Plans (UWMPs) which report, describe, and evaluate water deliveries and uses, water supply sources, efficient water uses, and demand management measures.

The UWMP Act directs water agencies in carrying out their long-term resource planning responsibilities to ensure adequate water supplies are available to meet existing and future demands. Urban water suppliers are required to assess current demands and supplies over a 20-year planning horizon and consider various drought scenarios. The UWMP Act also requires water shortage contingency planning and drought response actions to be included in a UWMP.

In November 2009, the Water Conservation Bill of 2009 (SBX7-7) was passed. This bill includes elements of the 20x2020 Water Conservation Plan which was designed to reduce the statewide per capita urban water use by 20 percent by the year 2020. The Water Conservation Bill of 2009 requires urban water suppliers to report in their UWMPs base daily per capita water use (baseline), an urban water use target, an interim urban water use target, and compliance daily per capita water use. This will enable water agencies, and in turn, the State of California, to track progress towards decreasing daily per capita urban water use throughout the state.

The Marin Municipal Water District (District) has prepared this UWMP to ensure the efficient use of available water supplies, determine existing baseline water consumption, establish water use targets, describe and evaluate the existing water system and historical and projected water use, evaluate current and projected water supply reliability, describe and evaluate demand management measures, and provide water shortage contingency plans as required by the UWMP Act.

1.1 Resource Optimization

The District understands that water is a limited resource and that a long-term reliable supply of water is essential to protect the local and state economy. It also recognizes, while conservation and efficient use of water is a statewide concern, planning for this use is best done at a local level.

As described in this UWMP, the District has developed local surface water supplies, and implemented both water conservation programs and a recycled water program to maximize the use of local resources and increase water supply reliability.

As a charter signatory to the California Urban Water Conservation Council's (CUWCC) MOU for Urban Water Conservation, the District is committed to reducing the per capita demand of its water customers. The District's programs for demand management through water conservation began in 1971 and a study in 1999 found that the per capita demand had been reduced by an estimated 25 percent during the period from 1970 to 1998. The District's *2007 Water Conservation Master Plan* illustrates its on-going dedication to a future where water waste is reduced, the environment is protected and water rates are based on the efficient use of available water resources. A more detailed discussion on the District's recycled water program and water conservation efforts are presented in Sections 4 and 6, respectively.

1.2 Coordination

The District met and coordinated with other local and regional agencies in the area during the preparation of this UWMP. The agencies and organizations contacted or involved in the preparation, discussion, and/or coordination of this UWMP are listed in Table 1-1.

Table 1-1 Coordination with Appropriate Agencies						
Coordinating Agencies	Participated in Development	Commented on the Draft	Attended Public Meetings	Contacted for Assistance	Received a Copy of the Draft	Sent a Notice of Intent to Adopt
City of Belvedere						X
City of Larkspur						X
City of Mill Valley						X
City of San Rafael						X
City of Sausalito						X
County of Marin				X		X
North Marin Water District						X
Sonoma County Water Agency	X			X		X
Town of Corte Madera						X
Town of Fairfax						X
Town of Ross						X
Town of San Anselmo						X
General Public			X		X	X

1.2.1 City and County Notification

The District sent out notices to cities within its service area, identified in Table 1-1, that the UWMP was being reviewed, modified, and prepared. A copy of the notice is provided in Appendix A.

1.2.2 Public Participation

The District has actively encouraged community participation in its water planning efforts over the years. With the initiation of urban water management plans, public meetings were then held for each of the 1985, 1990, 1995, 2000, and 2005 plans. As noted in the District's previous UWMP, in 1991 the District entered into an integrated water management plan process that encourages and incorporates public input as a part of the District's development of both water supply and demand management efforts.

The District has encouraged public participation in the development of the 2010 UWMP and provided opportunities for public review and comment. Notices of public hearings were placed in the local newspaper and posted at the District office. A copy of the notice is provided in Appendix B. The public notice stated that the UWMP was being updated and that the public was encouraged to provide oral and written comments on the UWMP.

On February 22 and on June 28, 2011, the District held public meetings that included presentations related to the 2010 UWMP. On July 6, 2011 the District conducted a public hearing in the District Board Room to hear and discuss any comments from the public prior to adopting the UWMP. This hearing provided an opportunity for the District's customers/residents and employees in the area to learn about the water supply situation and plans for providing a reliable, safe, high-quality water supply for the future.

1.3 Plan Adoption, Submittal, and Implementation

The 2010 UWMP was prepared during the spring of 2011. The updated plan was adopted by the District's Board of Directors at the July 6, 2011 meeting, and will be submitted to the California Department of Water Resources (DWR) within 30 days of Board approval. A copy of the resolution is provided in Appendix C.

Within 30 days of submitting the UWMP to the DWR, the adopted UWMP will be submitted to the California State Library, County of Marin, and the cities within the District's service area. The adopted UWMP will also be available for public review at the District office.

This UWMP will be implemented to meet the 2015 and 2020 urban water use targets. Daily per capita urban water use will be decreased throughout the service area by implementing the District's water conservation program, as defined in the District's *2007 Water Conservation Master Plan* (June 2007). The program includes the hiring of additional conservation staff, funding rebate programs at higher levels, improvements to the Customer Assistance Program, and additional funding for the new School Education Program. Significant improvements will



also be made in public outreach and marketing, conservation database and website development, contractor education, research, and regional development projects.

2.0 System Description

This section provides a description of the District's water system including a description of the climate, population, and demographics. This section also provides descriptions of the distribution system.

2.1 Description of District and Service Area

The District serves the populous eastern corridor of Marin County from the Golden Gate Bridge northward up to, but not including, Novato, and is bounded by the San Francisco Bay on the east, and stretches through the San Geronimo Valley in the west. The incorporated cities and towns of San Rafael, Mill Valley, Fairfax, San Anselmo, Ross, Larkspur, Corte Madera, Tiburon, Belvedere and Sausalito are within the District's service area.

Prior to the organization of the Marin Municipal Water District, water service was provided by several unrelated private water companies. The principal water companies operating in the County were the Marin Water and Power Company and the North Coast Water Company. In 1911, a group of public-spirited citizens organized the Southern Marin Water District Association to place the water supply of the County on a public ownership basis. As a result of the efforts and work of this organization, a petition bearing 1,863 validated signatures was presented to the County Board of Supervisors in January 1912, paving the way for an election for the incorporation of the Marin Municipal Water District. The District received its Charter from the Secretary of State on April 25, 1912. The Municipal Water District Act was created for the District, the pioneer municipal district in the state.

The District covers approximately 147 square miles and serves a population of approximately 190,000 through about 61,000 active service connections. The District's service area boundaries are illustrated in Figure 2-1.

As described in Table 2-1, the District's potable water distribution system includes approximately 941 miles of water mains, 90 pump stations, and 124 treated water storage tanks with a total storage capacity of 82 MG. The District treats water at its three treatment plants, the Bon Tempe Treatment Plant (BTTP) near Ross, the San Geronimo Treatment Plant (SGTP) in Woodacre, and the Ignacio treatment facility, which together have a combined capacity of 59 MGD.

Figure 2-2 illustrates the location of the District's water treatment plants and the distribution system. Pipelines range from 3/4-inch pipes that connect customers' water meters to the District's mains, to the 42-inch transmission pipes that carry source water to the treatment plants. The pipes are made of various materials, depending on when and where they were installed. Since the late 1970s, the District has installed only welded steel and polyvinyl chloride (plastic) mains due to their expected long life spans.



Figure 2-1. Service Area

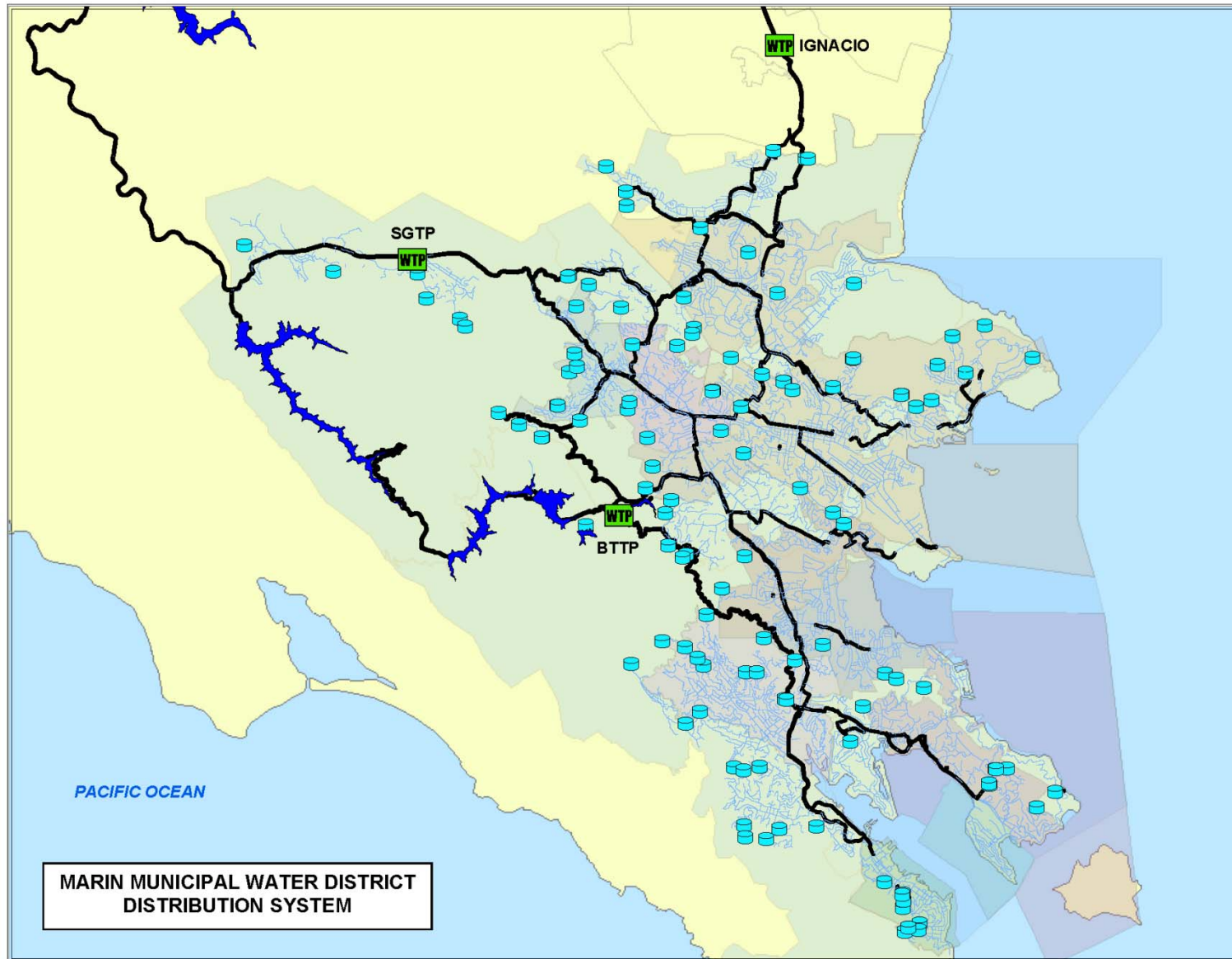


Figure 2-2. Distribution System

Table 2-1 Summary of Potable Water Facilities	
Facility	Value
Miles of pipeline	914
Number of storage tanks	124
Total tank storage capacity	82 MG
Number of pump stations	90
Number of potable water treatment plants	3
Maximum daily treatment plant capacity	59 MGD
Average daily treatment plant production	25 MGD

In addition to the District's potable water system, the District also owns and operates a recycled water system, which is described in detail in Section 4.7, and briefly summarized in Table 2-2.

Table 2-2 Summary of Recycled Water Facilities	
Facility	Value
Miles of pipeline	24
Number of storage tanks	3
Total tank storage capacity	1.9 MG
Number of pump stations	45
Number of recycled water treatment plants	1
Maximum daily treatment plant capacity	2 MGD

2.1 Climate

The District has a Mediterranean coastal climate. Summers are mild and dry, and winters are cool and wet, with an annual average of 30 inches of precipitation in the service area and over 50 inches of rainfall in the Mt. Tamalpais watershed. The region is subject to wide variations in annual precipitation and contains a multitude of microclimates. Summer fog helps reduce summer irrigation requirements.

2.2 Service Area Population

Marin County was typically characterized as a summer vacation area in the early 1900s. With the completion of the Golden Gate Bridge in 1936, the County began to develop into a bedroom community supporting the business and industry of San Francisco and the East Bay.

Growth in Marin, mainly residential in nature, boomed during the period following World War II up to the early years of the 1970s. Growth during the last two decades has averaged less than one percent per year, and the County Planning Department indicates that only four percent of

lands within the County remain available for new development. As shown in Table 2-3, the population within the District was level during the 1970's and 1980's. During that same period, the number of services increased by 21 percent, from 46,000 to 58,000 with the majority being residential services. During the same period of time, the number of people per household declined from 3.1 to 2.5. The 1990s and early 2000s has seen a trend of increasing population of less than one percent per year.

Table 2-3 Population and Consumption Trends within the District's Service Area		
Year	Population	Water Production (ac-ft/yr, potable and recycled)
1920	27,000	3,400
1930	36,000	4,935
1940	48,000	5,169
1950	75,000	10,282
1960	124,000	19,398
1970	168,000	32,239
1980	167,000	27,353
1990	168,000	28,868
1995	178,000	28,309
2000	185,100	31,324
2005	186,600	29,517
2010	190,600	25,982

Table 2-4 shows the estimated population for the District's service area for 2010 through 2035. These estimates are based on the Association of Bay Area Governments' (ABAG) projections to 2035 for the District's service area.

The ABAG figures project a continued slow growth rate of about 0.33 percent per year for the 25 year period. The methodology used in developing the District's service area population from the ABAG projections is included in Appendix D.

Table 2-4 Population — Current and Projected							
	2010	2015	2020	2025	2030	2035	Data Source ²
Service Area Population ¹	190,600	195,200	198,200	201,100	204,000	206,500	ABAG

1) Service area population is defined as the population served by the distribution system.

2) The population is based on Association of Bay Area Governments (ABAG) projections.

2.3 Past Drought and Emergency Conservation Information

The local region experienced a brief, but deep drought in the period from 1975 through 1977. This drought was severe and became the District's drought of record. A more prolonged drought punctuated with brief periods of rainfall occurred from 1987 through 1992.

During the 1970s drought, the District explored the feasibility of groundwater use and found those sources were very limited and was also impacted by the drought. The District increased its efforts to distribute low-flow showerheads, toilet tank displacement bottles and water conservation literature, and constructed pipelines across the Richmond-San Rafael Bridge and to Sonoma County to import water. Ultimately, the District relied heavily on the ability of its consumers to make radical reductions in the amount of water they consumed. During the final stage of the drought consumers reduced their water use by approximately 63 percent when the District went into a mandatory water use reduction program.

Following the 1970s drought, the District continued to add water conservation programs, added more surface water storage, and developed its recycled water program. By 1987 the water demand had returned to pre-drought levels. However, with improved supplies and the ability to import water from the Sonoma County Water Agency (SCWA), the District was able to reduce the requested mandatory water use reductions during the late 1980s and early 1990s drought. However, the water use reductions that were requested and achieved during this drought depressed water use for years after the drought had ended. Water use did not return to 1980 levels until the year 2001. Subsequently, increased water conservation efforts stabilized water use until the financial recession that began in 2008 reduced water demand to about the same low levels experienced during the early 1990s drought.

In summary, current water use within the District is lower than it was in 1970, despite the considerable increase in population over the last 40 years, as illustrated in Table 2-3. Considering the increase in population over the last 40 years, the District's consumers have reduced their per capita water consumption by 29 percent compared to the non-conserving water use levels of the 1970s.

3.0 System Demands

The District's past, current and projected water demands are presented in this section. This section also includes a baseline water use calculation and defines specific water use targets to meet the 2020 goal of 20 percent water use reduction. Current water demand is provided by water use sector and projected to 2035 in five-year increments. Current system losses are also provided and projected to 2035.

3.1 Baselines and Targets

The following sections describe the methods used to calculate the baseline water use and targets:

- ◆ **Baseline daily per capita water use:** The amount of water used within the District's distribution system area on a per capita basis.
- ◆ **Urban water use target:** The amount of water planned to be delivered in 2020 to each resident within the District's distribution system area, taking into account water conservation practices that are currently in place or which will be implemented.
- ◆ **Interim urban water use target:** The planned daily per capita water use in 2015, a value halfway between the baseline daily per capita water use and the urban water use target.

3.1.1 Base Period Ranges

Two baseline periods must be evaluated to calculate the base daily per capita water use:

- ◆ **10- to 15-Year Base Period:** This is a 10-year or 15-year continuous period used to calculate baseline per capita water use.
 - ▲ If recycled water makes up less than 10 percent of 2008 water deliveries, a continuous 10-year period is used.
 - ▲ If recycled water makes up 10 percent or more of 2008 water deliveries, a continuous 10- to 15-year period is used.
- ◆ **5-Year Base Period:** This is a continuous 5-year period used to determine whether the 2020 per capita water use target meets the legislation's minimum water use reduction requirements of at least a 5 percent reduction per capita water use.

The base period is used to calculate a base daily per capita water use, which is the baseline for computation of required future reductions. The District's 2008 water and recycled water deliveries are shown in Table 3-1. Recycled water made up about 2.1 percent of total water deliveries. Therefore, a 10-year base period is required to calculate baseline per capita water use. The baseline period of 1995 through 2004 was used. Table 3-1 also shows the 5-year base period used to calculate the minimum water use reduction requirement.

Table 3-1 Base Period Ranges			
Base	Parameter	Value	Units
10- Year Base Period	2008 total water deliveries	30,264	ac-ft
	2008 total volume of delivered recycled water	648	ac-ft
	2008 recycled water as a percent of total deliveries	2.1%	percent
	Number of years in base period ¹	10	years
	Year beginning base period range	1995	
	Year ending base period range	2004	
5-Year Base Period	Number of years in base period	5	years
	Year beginning base period range	2003	
	Year ending base period range	2007	

1) The 2008 recycled water as a percent of total deliveries is less than 10 percent. Therefore, the first base period is a continuous 10-year period.

3.1.2 Base Daily Per Capita Water Use

The daily per capita water use was calculated for each year in the base period by dividing the gross water use by the distribution system population. The daily per capita water use for the 10-year base period is shown in Table 3-2. The base daily per capita water use is calculated as the average daily per capita water use over the 10-year period.

Table 3-2 Base Daily Per Capita Water Use — 10-Year Range				
Base Period Year		Distribution System Population	Daily System Gross Water Use (mgd)	Annual Daily Per Capita Water Use (gpcd)
Sequence Year	Calendar Year			
Year 1	1995	175,000	24.6	141
Year 2	1996	178,000	25.3	142
Year 3	1997	180,000	26.7	148
Year 4	1998	182,000	25.1	138
Year 5	1999	184,000	26.5	144
Year 6	2000	185,100	27.5	149
Year 7	2001	185,400	28.4	153
Year 8	2002	185,700	28.0	151
Year 9	2003	186,000	27.2	146
Year 10	2004	186,300	27.7	149
Base Daily Per Capita Water Use				146

The daily per capita water use for the 5-year base period is shown in Table 3-3. The base daily per capita water use is calculated as the average daily per capita water use over the 5-year period. Multiplying the 5-year base daily per capita water use by 0.95 results in a value of 135 gpcd. The 2020 per capita water use target cannot exceed this value.

Table 3-3 Base Daily Per Capita Water Use — 5-Year Range				
Base Period Year		Distribution System Population	Daily System Gross Water Use (mgd)	Annual Daily per Capita Water Use (gpcd)
Sequence Year	Calendar Year			
Year 1	2003	186,000	27.2	146
Year 2	2004	186,300	27.7	149
Year 3	2005	186,600	25.9	139
Year 4	2006	187,400	26.1	139
Year 5	2007	188,200	26.2	139
Base Daily Per Capita Water Use				142
Base Daily Per Capita Water Use x 0.95				135

3.1.3 Water Use Targets

An urban water use target for the year 2020 and an interim water use target for the year 2015 must be set using one of four methods:

- ◆ **Method 1:** Eighty percent of the water supplier's baseline per capita water use.
- ◆ **Method 2:** Per capita daily water use estimated using the sum of performance standards applied to indoor residential use; landscaped area water use; and CII uses.
- ◆ **Method 3:** Ninety-five percent of the applicable state hydrologic region target as stated in the State's April 30, 2009, draft 20x2020 Water Conservation Plan.
- ◆ **Method 4:** An alternative approach developed by the DWR that takes into consideration water loss, conservation program saturation, and a number of other factors.

Method 3 was used to determine the District's water use targets. The District's service area is within Hydrologic Region 2 - San Francisco Bay Area. The 2020 urban water use target for this region is 124 gpcd.

The maximum allowable gpcd target in 2020, based on 95 percent of the 5-year base daily per capita water use, was determined to be 135 gpcd. The target based on Method 3 (124 gpcd) is less than the 135 gpcd maximum, therefore no further adjustment to the 2020 target is required.

The interim water use target for year 2015 was estimated as the mid-point between the 10-year baseline per capita water use of 146 gpcd and the 2020 target of 124 gpcd. A summary of the water use targets is provided in Table 3-4.

Table 3-4 Baseline and Water Use Targets	
Water Use Target	Daily Per Capita Water Use (gpcd)
Baseline	146
Interim Water Use Target (2015) ¹	137
Urban Water Use Target (2020) ¹	124

1) Targets are based on Method 3 and Hydrologic Region 2 - San Francisco Bay Area.

3.2 Water Demands

This section quantifies past, current, and future water demands by water use sectors (i.e. single family residential, multi-family residential, commercial, etc.). Water use projections are also provided for recycled water, water losses, and low income single family and multi-family housing units.

3.2.1 Actual Water Deliveries

Past and current water use were quantified and distributed between water use sectors. Actual number of accounts and water deliveries are summarized in Table 3-5 for the year 2005 and in Table 3-6 for the year 2010.

Table 3-5 Water Deliveries — Actual, 2005					
Water Use Sectors	2005				
	Metered		Not Metered		Total
	# of Accounts	Volume (ac-ft/yr)	# of Accounts	Volume (ac-ft/yr)	Volume (ac-ft/yr)
Single Family	50,817	15,027	0	0	15,027
Multi-Family	4,522	3,630	0	0	3,630
Commercial	3,372	3,061	0	0	3,061
Industrial	0	0	0	0	0
Institutional / Governmental	244	1,726	0	0	1,726
Landscape	1,032	1,319	0	0	1,319
Agriculture	0	0	0	0	0
Other	0	0	0	0	0
Total	59,987	24,763	0	0	24,763

Table 3-6 Water Deliveries — Actual, 2010					
Water Use Sectors	2010				
	Metered		Not Metered		Total
	# of Accounts	Volume (ac-ft/yr)	# of Accounts	Volume (ac-ft/yr)	Volume (ac-ft/yr)
Single Family	50,639	13,501	0	0	13,501
Multi-Family	4,509	3,404	0	0	3,404
Commercial	3,335	2,721	0	0	2,721
Industrial	0	0	0	0	0
Institutional / Governmental	244	1,641	0	0	1,641
Landscape	1,012	1,205	0	0	1,205
Agriculture	0	0	0	0	0
Other	0	0	0	0	0
Total	59,739	22,471	0	0	22,471

The distribution of water use among the water use sectors is illustrated in Figure 3-1. The number of water service connections and volume of water served provide insight into different customers' water use, which can be useful in defining effective water conservation measures. Most service connections are single family residential which on average represents about 60 percent of the total demand.

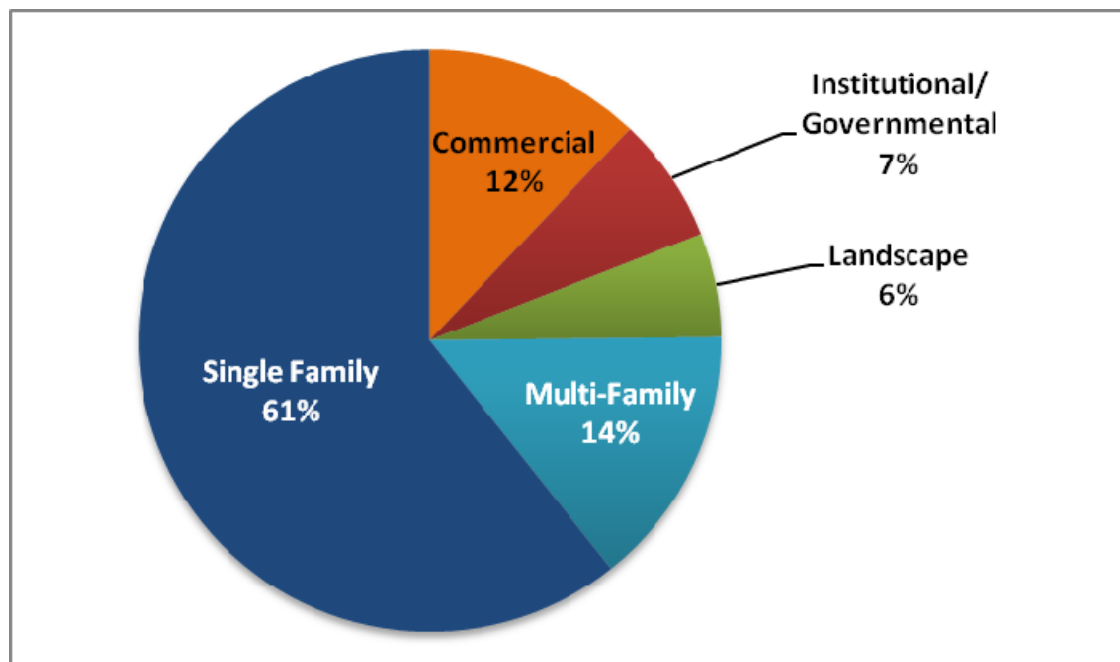


Figure 3-1. Distribution of Water Use among Water Use Sectors

3.2.2 Projected Water Deliveries

Water demand projections were developed through 2035 using the District's Demand Side Management Least Cost Planning Decision Support System (DSS) model. The model incorporates the following information:

- ◆ 2005 data including level of water use, baseline accounts in each customer category and baseline forecasts for population and employment.
- ◆ Key assumptions on the natural replacement rate of fixtures, how residential or commercial future use is projected, and the percent of water losses including unmetered and unbilled uses.
- ◆ ABAG estimated population growth projections.
- ◆ Estimated value of water saved, historical water use, past conservation efforts, and water system facilities.

Water demand projections were adjusted to include water savings through continued implementation of the District's *2007 Water Conservation Master Plan*.

The demand projections also include water savings resulting from new development ordinances, plumbing codes, and the Cal Green building code which require new installations of water efficient fixtures or the replacement of old fixtures.

Table 3-7 provides a summary of water demand projections for the year 2015. The projected per capita water use is about 129 gpcd (including raw water and water losses in Table 3-10). This is lower than the 2015 target of 137 gpcd. Water demands have been reduced through water conservation efforts implemented by the District and meeting the requirements of the plumbing codes.

Table 3-8 provides a summary of water demand projections for the year 2020. The projected per capita water use is about 124 gpcd (including raw water and water losses in Table 3-10), which meets the 2020 target of 124 gpcd.

Table 3-7 Water Deliveries — Projected, 2015					
Water Use Sectors	2015				
	Metered		Not Metered		Total
	# of Accounts	Volume (ac-ft/yr)	# of Accounts	Volume (ac-ft/yr)	Volume (ac-ft/yr)
Single Family	53,131	15,478	0	0	15,478
Multi-Family	4,731	3,615	0	0	3,615
Commercial	3,532	2,894	0	0	2,894
Industrial	0	0	0	0	0
Institutional / Governmental	252	1,683	0	0	1,683
Landscape	1,070	1,301	0	0	1,301
Agriculture	0	0	0	0	0
Other	0	0	0	0	0
Total	62,716	24,971	0	0	24,971

Table 3-8 Water Deliveries — Projected, 2020					
Water Use Sectors	2020				
	Metered		Not Metered		Total
	# of Accounts	Volume (ac-ft/yr)	# of Accounts	Volume (ac-ft/yr)	Volume (ac-ft/yr)
Single Family	53,947	15,332	0	0	15,332
Multi-Family	4,803	3,553	0	0	3,553
Commercial	3,586	2,770	0	0	2,770
Industrial	0	0	0	0	0
Institutional / Governmental	256	1,693	0	0	1,693
Landscape	1,045	1,052	0	0	1,052
Agriculture	0	0	0	0	0
Other	0	0	0	0	0
Total	63,677	24,401	0	0	24,401

Table 3-9 provides a summary of water demand projections for 2025 through 2035. The District's continued conservation efforts are projected to further reduce the per capita water use beyond the 2020 target to about 119 gpcd by 2035 (including raw water and water losses in Table 3-10).

Table 3-9 Water Deliveries — Projected 2025, 2030, and 2035						
Water Use Sectors	2025		2030		2035	
	Metered		Metered		Metered	
	# of Accounts	Volume (ac-ft/yr)	# of Accounts	Volume (ac-ft/yr)	# of Accounts	Volume (ac-ft/yr)
Single Family	54,736	15,300	55,526	15,382	56,206	15,441
Multi-Family	4,873	3,507	4,943	3,493	5,004	3,481
Commercial	3,638	2,721	3,691	2,717	3,736	2,714
Industrial	0	0	0	0	0	0
Institutional / Governmental	260	1,711	263	1,733	267	1,752
Landscape	1,058	1,066	1,071	1,081	1,082	1,097
Agriculture	0	0	0	0	0	0
Other	0	0	0	0	0	0
Total	64,565	24,304	65,494	24,406	66,295	24,486

3.2.3 Sales to Other Water Agencies

The District does not currently sell water to any other agency.

3.2.4 Additional Water Uses and Losses

Additional water uses include recycled water and raw water which is untreated surface water. Actual and projected recycled water and raw water uses not accounted for in Table 3-5 through Table 3-9 are provided in Table 3-10.

Table 3-10 Additional Water Uses and Losses (ac-ft/yr)							
Water Use ¹	2005	2010	2015	2020	2025	2030	2035
Saline Barriers	0	0	0	0	0	0	0
Groundwater Recharge	0	0	0	0	0	0	0
Conjunctive Use	0	0	0	0	0	0	0
Raw Water	291	258	350	350	350	350	350
Recycled Water	529	514	534	763	765	766	768
System Losses	3,937	2,738	2,813	2,798	2,782	2,778	2,777
Other	0	0	0	0	0	0	0
Total	4,757	3,510	3,697	3,911	3,897	3,894	3,895

1) Any water accounted for in Table 3-5 through Table 3-9 are not included in this table.

Unaccounted for water, or water loss, is defined to be the difference between water produced and water sold to customers. Unaccounted for water use normally includes unmetered water use such as for fire protection, system leaks, and unauthorized connections. Unaccounted for

water can also result from meter inaccuracies. Unaccounted water uses and real losses are listed as “system losses” in Table 3-10. In California, unaccounted for urban water generally ranges from 6 to 15 percent. In 2005 and 2010, the District’s average unaccounted water was about 13.7 percent and 10.8 percent, respectively. Unaccounted water is projected to be about 9.3 to 9.1 percent in the future. The decrease in future unaccounted for water is due to the leak detection and repair program that is included in the District’s *2007 Water Conservation Master Plan*, as described in Appendix E.

3.2.5 Total Water Use

The District’s total water demands based on continued implementation of the *2007 Water Conservation Master Plan* are summarized in Table 3-11.

Table 3-11 Total Water Use (ac-ft/yr)							
Water Use	2005	2010	2015	2020	2025	2030	2035
Total Water Deliveries	24,763	22,471	24,971	24,401	24,304	24,406	24,486
Sales to Other Water Agencies	0	0	0	0	0	0	0
Additional Water Uses and Losses	4,757	3,510	3,697	3,911	3,897	3,894	3,895
Total	29,520	25,981	28,668	28,312	28,201	28,301	28,381

For comparison purposes, Table 3-12 presents the forecasted water demand if the District’s per capita water use were to remain at the baseline of 146 gpcd. As shown, the District’s conservation efforts are estimated to save over 3,200 ac-ft/yr in 2020.

Table 3-12 Alternate Water Use Projection – No Further Conservation (ac-ft/yr)							
Water Use	2005	2010	2015	2020	2025	2030	2035
Total Water Use (Table 3-11)	29,520	25,981	28,668	28,312	28,201	28,301	28,381
Total Water Use with Baseline gpcd	29,520	25,981	31,058	31,536	31,997	32,459	32,856
Estimated Conservation Savings	0	0	2,391	3,224	3,796	4,158	4,476

3.2.6 Lower-Income Projected Water Demands

State legislation (SB 1087 and Government Code §65589.7), effective January 1, 2006, specifies that local water agencies and sewer districts must grant priority for service hook-ups to projects that help meet the community’s fair housing need.

A lower-income household is defined as a household that earns less than 80 percent of the median income, adjusted for family size. Based on the *San Francisco Bay Area Housing Needs Plan, 2007-2014* (ABAG, June 2008), the number of new lower-income homes to be constructed between 2007 and 2014 is about 1,403 housing units. This represents about 29

percent of the total new construction over the same period. This percentage was applied to the total number of new construction occurring between 2015 and 2035 to estimate the number of lower-income households.

The estimated residential per unit water demand is about 0.22 ac-ft/yr. This water demand was applied to the number of future lower-income households. Table 3-13 provides a summary of lower-income water demands. These water use projections are included in the overall water use projections provided in Table 3-7 through Table 3-9.

Table 3-13 Lower-Income Projected Water Demands					
	2015	2020	2025	2030	2035
Number of New Lower-Income Households	304	339	336	344	339
Lower-Income Water Demands (ac-ft/yr) ¹	68	74	72	73	71

1) These demands are included in the overall water use projections provided in Table 3-7 through Table 3-9.

3.3 Imported Water Demand Projections

The District's water use projections for imported water from the Sonoma County Water Agency (SCWA) are shown in Table 3-14. These demands have been coordinated with the demands listed in SCWA's 2010 UWMP.

Table 3-14 Retail Agency Demand Projections Provided to Wholesale Suppliers (ac-ft/yr)							
Wholesaler	Contracted Volume	2010	2015	2020	2025	2030	2035
Sonoma County Water Agency	14,300	6,521	8,500	8,500	8,500	8,500	8,500

3.4 Water Use Reduction Plan

The District adopted its *2007 Water Conservation Master Plan* in June 2007. The plan includes various conservation measures. The most aggressive set of conservation measures is referred to as Program 3. It includes the hiring of additional conservation staff, funding rebate programs at higher levels, improvements to the Customer Assistance Program, and additional funding for the new School Education Program. Significant improvements will also be made in public outreach and marketing, conservation database and website development, contractor education, research, and regional development projects. Descriptions of the conservation measures that are included in this program are provided in Table 3-15. Additional descriptions of Program 3 are provided in the *Final 2010 Urban Water Management Plan Water Demand Analysis* (Maddaus Water Management, February 2011) in Appendix E.

Table 3-15
Conservation Measure Descriptions

Customer Sector	Name of Measure	Description
SF, MF	Residential Water Surveys - Indoor	This is the indoor component of indoor and outdoor water surveys for existing single-family and multi family residential customers. Normally those with high water use are targeted and provided customized report to homeowner.
SF, MF	Residential Water Surveys - Outdoor	This is the outdoor component of indoor and outdoor water surveys for existing single-family and multi family residential customers. Normally those with high water use are targeted and provided customized report to homeowner.
SYSTEM	UFW Reduction	The District will increase efforts to find and repair leaks in the distribution system and take other actions (such as meter replacement) to reduce water losses. A ten year program to reduce unaccounted for water by 3.0 percent is proposed for this measure.
IRR	Water Budgets	90% - 100% of all irrigators of landscapes with separate irrigation accounts would receive a monthly or bi-monthly irrigation water use budget.
COM, INS	Large Landscape Conservation Audits	All public and private irrigators of landscapes larger than one acre would be eligible for free landscape water audits upon request.
SF	Clothes Washer Rebate	Homeowners would be eligible to receive a rebate on a new water efficient clothes washer.
SF, New SF	Public Information Program	Public education would be used to raise awareness of other conservation measures available to customers. Programs could include poster contests, speakers to community groups, radio and television time, and printed educational material such as bill inserts, etc.
COM, INS	Commercial Water Audits	High water use accounts would be offered a free water audit that would evaluate ways for the business to save water and money.
SF	Single Family Residential ULF Toilet Rebate	Homeowners would be required to replace an existing high volume toilet with a 1.6 gallon per flush efficient toilet when name account changes.
RMF	Multi Family Residential ULF Toilet Rebate	Homeowners would be required to replace an existing high volume toilet with a 1.6 gallon per flush efficient toilet when name account changes.
SF	Single Family Toilet Ordinance	A single family toilet ordinance to replace existing toilets.
MF	Multifamily Toilet Ordinance	A multifamily toilet ordinance to replace existing toilets.
Existing Customers SF	Rain-Sensor (shut off device) Retrofit on Irrigation Controllers	Agency pays for the \$40 rain sensor, homeowner pays for the optional installation (\$35).
Existing Customers: SF & MF	High Efficiency Toilet (HET)	Provide a \$250 rebate or voucher for the installation of a high efficiency toilet (HET). HET are defined as any toilet to flush 20% less than an ultra low flow toilet (ULFT) and include dual flush technology. Rebate amounts would reflect the incremental purchase cost.
Existing Customers: SF & Condo	Homeowner Landscaping and Irrigation Classes	Sponsor classes at stores where irrigation equipment is sold or other suitable venues on selection and installation of efficient plant material and irrigation equipment (drip irrigation, smart controllers, low volume sprinklers, etc.).
Existing Customers MF	Coin-Op Washing Machine Rebate	Provide a \$400 rebate for efficient coin-op washing machines to existing apartment complexes over a certain size with a common laundry room.

Table 3-15
Conservation Measure Descriptions

Customer Sector	Name of Measure	Description
Existing Customers SF, Condo, MF, CII, IRR	Financial Incentives/ Rebates for Irrigation Upgrades including Smart Irrigation Controllers	For SF, Condo, MF, CII, and IRR customers with landscape, provide for rebates towards the purchase and installation of selected types of irrigation equipment upgrade including low volume sprinkler heads, check valves, smart irrigation controllers. Rebate is \$450 for residential accounts and up to \$650 for mixed use accounts and up to \$3,500 for dedicated irrigation accounts. Provide up to \$450 for SF, and up to \$3,500. Assume average rebate claimed equates to \$1,500 for non-Residential accounts.
Existing Customers: CII	Hotel Retrofit (w/ financial assistance) - CII Existing	Following a free water audit, offer the hotel a rebate for equipment identified that would save water. Provide a rebate schedule for certain efficient equipment such as air-cooled ice machines, steamers, washers, cooling towers, and spray rinse valves.
Existing Customers: CII	CII Rebates - Replace inefficient water using equipment	Provide a rebate for a standard list of water efficient equipment. Included would be x-ray machines, icemakers, air-cooled ice machines, steamers, washers, spray valves, efficient dishwashers, replace once through cooling, add conductivity meters on cooling.
Existing Customers: CII	0.5 gal/flush urinals in existing buildings	Provide a \$350 rebate for existing buildings to encourage installation of 0.5 gal/flush urinals rather than the current standard of 1.0 gal/flush models.
SF, Condo, MF, COM, INS	Install AMS and Leak Detection Customer Notification	Install advanced metering systems (AMS) and leak detection meters. A call or email will be placed to customers if there is a leak. Will be as automated as possible by a computer program, use 1 full time staff person. Cost will be approximately \$100,000 per year.
New Customers: SF, Condo, RMF, COM, INS	Rain-sensor shut off device on irrigation controllers	Require-sensor or rain shut off devices with all new automatic irrigation system installations on new homes and buildings.
New Customers: SF, Condo, RMF, COM, INS	Smart Irrigation Controller	Require developers to provide the latest state of the art SMART irrigation controllers. These SMART controllers have on-site temperature sensors or rely on a signal from a central weather station that modifies irrigation times at least weekly.
New Customers: SF, Condo, RMF, COM, INS	High Efficiency Toilet (HET)	Require developers to install a high efficiency toilet (HET). HET are defined as any toilet to flush 20% less than an ULFT and include dual flush technology.
New Customers: SF, Condo, RMF, COM, INS	Dishwasher New Efficient	Require developers to install an efficient dishwasher (meeting certain water efficiency standards, such as gallons/load).
New Customers: SF, Condo, RMF, COM, INS	Clothes washing machines requirement for new residential	Building departments would be responsible to ensure that an efficient washer was installed before new home or building occupancy.
New Customers: SF, Condo, RMF, COM, INS	Hot Water on Demand	Require developers to equip new homes or buildings with a hot water on demand system or tankless hot water heaters, such as those made by Metland Systems and others. These systems use a pump placed under the sink to recycle water sitting in the hot water pipes.

Table 3-15 Conservation Measure Descriptions		
Customer Sector	Name of Measure	Description
New Customers: SF, Condo, RMF, COM, INS	High efficiency faucets and showerheads	Require developers to install lavatory faucets that flow at no more than 1.5 gallons per minute (gpm), kitchen faucets at 2.2 gpm, showerheads at 2.0 gpm.
New Customers: SF, Condo, RMF, COM, INS	Landscape and irrigation requirements	Enforce a regulation that specifies that homes or buildings be landscaped according to Xeriscape principals, with appropriate irrigation systems. (Combines with Smart Controller listed above). Goal is overall 25% in irrigation water use (measure 2 and 9 combined).
New Customers: MF	Multi Family Submetering	Require all new multi-family units to provide submeters on individual units. To help reduce financial impacts on tenants, regulators would be adopted that specify acceptable methods of metering and billing.
New Customers: CII	Offer new accounts reduced connection fees for installing efficient process equipment for selected businesses (restaurants, laundry mat, food/groceries and hospital)	Offer reduced water and sewer connection fees to new facilities to install water efficient equipment in new facilities that goes above and beyond the building code requirements. Model program after Santa Rosa's BAT program.
New Customers: CII	0.5 gal/flush urinals in new buildings	Require that new buildings be fitted with 0.5 gal/flush urinals rather than the current standard of 1.0 gal/flush models.

NOTE: RSF = Residential Single Family, RMF = Residential Multi Family, NRSF = New Residential Single Family, COM = Business, INS = Institutional, IND = Industrial

With the implementation of Program 3, the estimated daily per capita water use is as shown in Table 3-16. Based on these estimates, the interim and 2020 water use reduction targets will be achieved.

Table 3-16 Daily Per Capita Water Use (gpcd)		
Year	Projected Per Capita Water Use with Conservation Program 3	Target Per Capita Water Use
2015	129	137
2020	124	124

3.5 Regional Alliance

In addition to meeting the daily per capita water use targets on an individual basis, the Water Conservation Bill of 2009 also allows urban water retail suppliers to plan, comply and report on the 2015 and 2020 water use targets on a regional basis. As defined in DWR's *Methodologies for Calculating Baseline and Compliance Urban Per Capita Water Use*, the District is eligible to participate in a regional alliance with SCWA's other retail water supply agency's (the Water Contractors) since they all receive wholesale water from a common wholesale water supplier, SCWA.

The District has joined a regional alliance with the Water Contractors, which include the Cities of Santa Rosa, Rohnert Park, Sonoma, Cotati, Petaluma, Town of Windsor, North Marin Water District (NMWD) and Valley of the Moon District (VOMWD) to comply with the daily per capita water use targets on a regional basis.

The alliance has selected Target Method 1, as previously described, to determine the regional alliance target. Table 3-17 provides the individual and regional alliance water use targets for both 2015 and 2020.

Table 3-17 Regional Alliance Population, Water Use, and Regional Target						
Regional Alliance Member	2015			2020		
	Current Population	Water Contractor Individual GPCD Target	Product of Population and GPCD Target [(1)x(2)]	Current Population	Water Contractor Individual GPCD Target	Product of Population and GPCD Target [(1)x(2)]
	(1)	(2)	(3)	(1)	(2)	(3)
District	190,600	137	26,074,080	190,600	124	23,634,400
Santa Rosa	163,436	136	22,227,296	163,436	127	20,756,372
Rohnert Park	43,398	140	6,075,720	43,398	119	5,164,362
Cotati	7,711	134	1,033,274	7,711	130	1,002,430
Petaluma	58,401	153	8,935,353	58,401	136	7,942,536
Windsor	28,134	143	4,023,162	28,134	130	3,657,420
NMWD	61,012	161	9,822,932	61,012	143	8,724,716
VOMWD	23,478	136	3,193,008	23,478	124	2,911,272
Total	587,596		83,601,469	587,596		75,770,206
Compliance Year					2015	2020
Regional GPCD Target [Total of (3) / Total of (1)]					142	129

Members of the regional alliance project that the regional alliance will be in compliance with its 2015 and 2020 water use targets as shown in Table 3-18, which provides the projected 2015 and 2020 compliance daily per capita water use for the regional alliance.

Table 3-18 Regional Alliance Daily Per Capita Water Use (gpcd)		
	2015	2020
Regional Per Capita Water Use Target	142	129
Total Projected Per Capita Water Use	134	128

A copy of the letter to DWR regarding the formation of the regional alliance, as well as the letter agreement forming the regional alliance and the District's Board Resolution approving the letter agreement are included in Appendix F.



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4.0 System Supplies

This section describes existing and future sources of water available to the District. It includes a description of each water source, source limitations, water quality, and future opportunities.

4.1 Water Sources

The District's water supplies come from a combination of local surface water supplies, imported water from SCWA, and recycled water. Table 4-1 provides a summary of current and projected water supplies. Each water supply is described further in the following sections.

Table 4-1 Water Supplies — Current and Projected (ac-ft/yr)						
Water Supply Sources	2010	2015	2020	2025	2030	2035
Sonoma County Water Agency ¹	6,521	8,500	8,500	8,500	8,500	8,500
Supplier-Produced Groundwater	0	0	0	0	0	0
Supplier-Produced Surface Water	19,077	20,000	20,000	20,000	20,000	20,000
Transfers In	0	0	0	0	0	0
Exchanges In	0	0	0	0	0	0
Recycled Water	514	534	763	765	766	768
Desalinated Water	0	0	0	0	0	0
Total	26,112	29,034	29,263	29,265	29,266	29,268

1) Volumes shown here are consistent with Table 4-3 and were provided to SCWA for inclusion in their 2010 UWMP.

4.2 Local Surface Water Supplies

Until 1976, all of the District's water supply was obtained solely from rainfall collected from a watershed of approximately 28 square miles of District-owned lands, and 36 square miles not owned by the District. Six reservoirs in the watershed had a storage capacity of 17.3 billion gallons. Through a bond issue authorized during the drought of the 1970s a seventh reservoir was completed in 1980, Soulajule Reservoir, which added 3.4 billion gallons to the total storage.

The District's Kent Lake facility was expanded, in 1982, by raising the existing dam 45 feet, increasing the storage capacity from 5.4 billion gallons to 10.6 billion gallons.

Total reservoir storage operated by the District is now 25.9 billion gallons (79,566 ac-ft). Pertinent data on the reservoir system is provided in Table 4-2. A map of the reservoir system and the watersheds is shown in Figure 4-2.

Table 4-2 District Surface Water Reservoir System			
Reservoir Name	Year Constructed	Storage Capacity (ac-ft)	Water Rights
Lake Lagunitas	1873	350	Pre-1914
Phoenix Lake	1905	411	Pre-1914
Bon Tempe Reservoir	1948	4,017	Appropriative Permit No. 05633
Alpine Lake	1918	3,069	Pre-1914
	1924	4,600	Appropriative Permit No. 05633
	1941	8,891	
Kent Lake	1953	16,050	Appropriative Permit No. 05633, 09390, 18546
	1982	32,895	
Nicasio Reservoir	1960	22,430	Appropriative Permit No. 12800
Soulajule Reservoir	1980	10,572	Appropriative License 12807 and Permit No. 16892
Total Existing Reservoir Storage		79,566	

The annual inflow data for the District's reservoir system for the period 1928 to 2009 is shown on Figure 4-1. The annual runoff into the District's reservoirs varies greatly from a maximum of 220,000 ac-ft in 1983 to a minimum of only 4,100 ac-ft in 1977. The average and median annual runoff are 84,800 ac-ft and 72,300 ac-ft respectively.

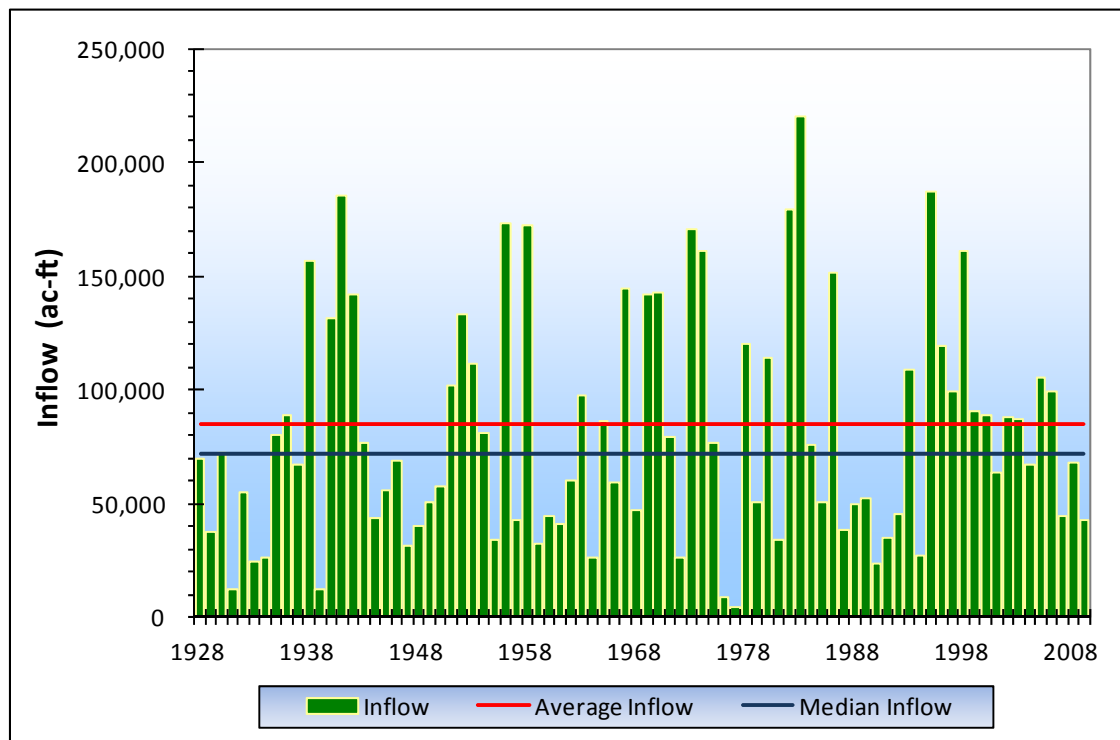


Figure 4-1. Annual Reservoir Inflow

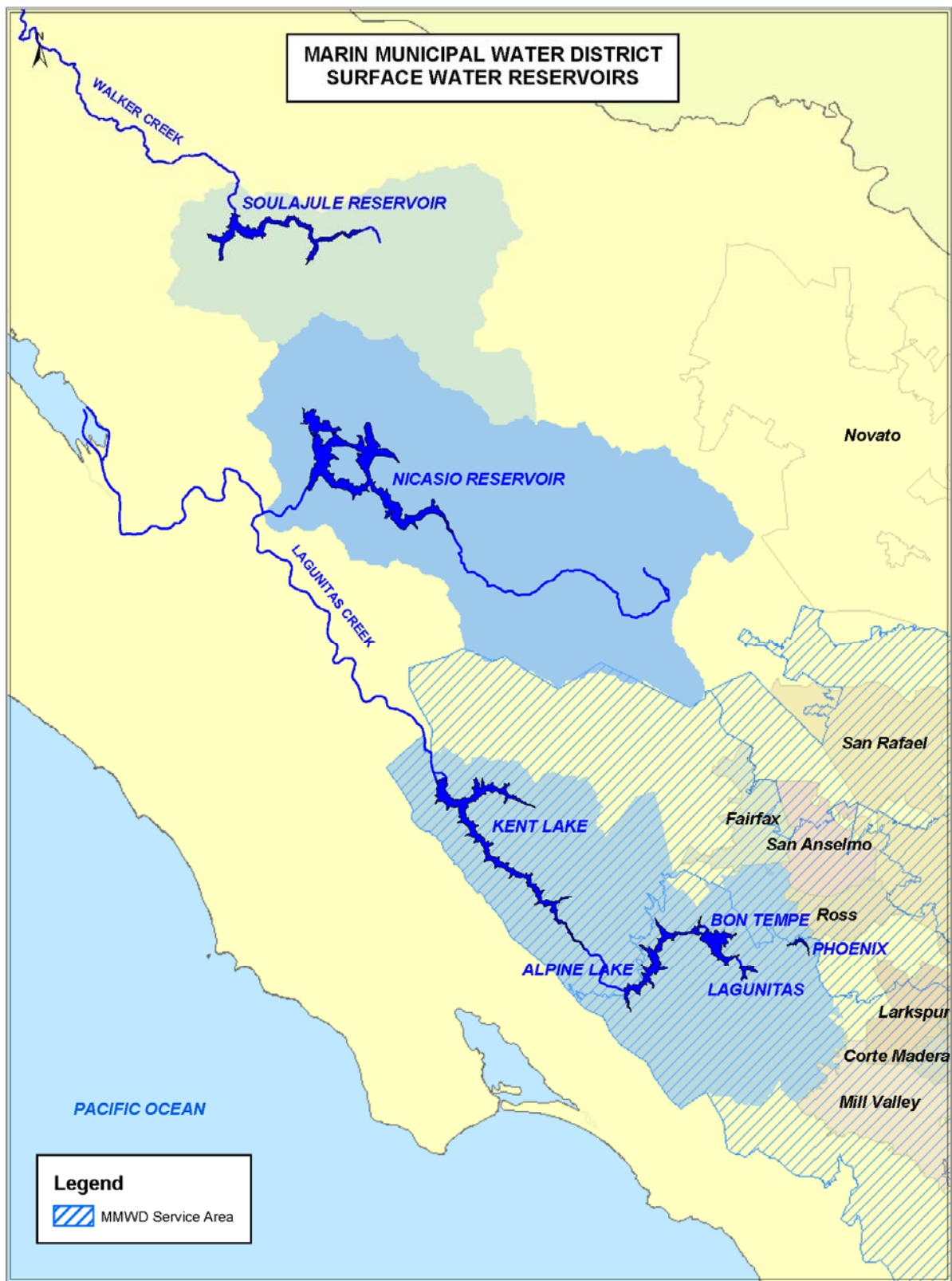


Figure 4-2. Surface Water Reservoirs

Surface water from the Mt. Tamalpais watershed is aerated seasonally in the reservoirs to maintain adequate dissolved oxygen concentration. From the reservoirs, the water is conveyed to either the Bon Tempe Treatment Plant (BTTP) near Ross or the San Geronimo Treatment Plant (SGTP) in Woodacre. Suspended matter is removed in clarifiers, microscopic particles are removed in deep-bed, multi-media filters, and bacteria and pathogens are inactivated by disinfectants. The water is then treated to control corrosion. Since the passage of a voter referendum in 1972, fluoride has been added to the water to prevent tooth decay.

The water imported from SCWA, discussed in the following section, is naturally filtered in the deep sand and gravel below the river bed and requires no further clarification. This water enters the District's system at the Ignacio Water Quality and Pumping Station, where water quality is monitored continually. Final treatment is similar to that used at the two reservoir treatment plants.

4.3 Imported Water Supplies

Since 1975 the District has contracted with the SCWA for a supplemental supply of water, primarily from Lake Sonoma via the Russian River. The District's present contract with SCWA is based on two antecedent documents: the 1975 Off-Peak Water Supply Agreement and its amendments and the 1991 Agreement for the Sale of Water between SCWA and the District. In 1996, these two contracts were combined into a single new agreement, the Supplemental Water Supply Agreement.

In its original form, the Off-Peak Agreement allowed the District to take delivery, in the months of October through April, of up to 4,300 ac-ft of water surplus to the needs of all other SCWA customers. The contract was amended twice before its inclusion in the Supplemental Water Supply Agreement of 1996. The first amendment changed the basis of delivery of this water from "surplus" to "firm", meaning that the District's water deliveries would be as reliable as was provided to SCWA's contractors. The second amendment allowed deliveries during the summer months.

The 1991 Agreement for Water Supply allowed the District to take deliveries of up to 10,000 ac-ft of water per year beyond the amount included in the Off-Peak Agreement. These water deliveries were classified as "as available." This meant that the contracted water supply was secondary to water provided to SCWA's contractors, and to water provided under the Off-Peak Agreement, but would be provided unless certain predefined conditions existed.

The Supplemental Water Supply Agreement combined the two prior agreements such that the District can now take deliveries of up to 14,300 ac-ft per year from SCWA. All of these deliveries are also now classified as "firm" water. In addition to the annual delivery limit, the Agreement also places seasonal limitations on water delivery rates to the District. In winter the maximum delivery rate is 23 million gallons per day (mgd), and in the summer, total deliveries are limited to 12.8 mgd.

The contract will remain in force until June 30, 2014 but can be extended at the request of the District to the expiration date of the current Russian River water supply master agreement, the Restructured Agreement, between SCWA and its eight prime contractors other than the District. The expiration date of the Restructured Agreement is June 30, 2040.

In addition to the contractual delivery limits, Russian River water deliveries to the District are subject to available pipeline capacity in facilities owned by SCWA and the North Marin Water District (NMWD). Russian River water is diverted by SCWA at a series of sub-surface collectors near Wohler Bridge in Sonoma County. SCWA also has backup/supplemental well capacity at Mirabel and Laguna de Santa Rosa that it uses to address operational and maintenance activities of the agency. Water destined for the District flows through SCWA pipelines to Petaluma. From Petaluma the water flows southward in NMWD's aqueduct eight miles to the northern end of the District's pipeline facilities in Novato. The District's rights to use the excess capacity in NMWD's facilities are described in the Intertie Agreement from 1993. This Agreement will expire on the same date as the SCWA Restructured Agreement, June 30, 2040.

A summary of projected imported water supplies is provided in Table 4-3.

Table 4-3 Wholesale Supplies — Existing and Planned Sources of Water (ac-ft/yr)						
Wholesale Sources ^{1,2}	Contracted Volume	2015	2020	2025	2030	2035
Sonoma County Water Agency	14,300	8,500	8,500	8,500	8,500	8,500

1) Water volumes presented here have been accounted for in Table 4-1.

2) The Sonoma County Water Agency is a wholesale water provider to retail customers in Sonoma and Marin County. The "contractors" consist of the North Marin Water District, City of Petaluma, City of Rohnert Park, City of Santa Rosa, City of Sonoma, Valley of the Moon Water District, Town of Windsor, and City of Cotati.

As NMWD and SCWA water use increases in the future there will be less pipeline capacity in their facilities available for water deliveries to the District. When these limitations have a significant impact on water deliveries, the District will have to construct, either on its own or in conjunction with those agencies, new pipelines to supplement the capacity available in the other agencies' facilities and assure continued delivery of Russian River water to the District. The need for, and the timing of such improvements has been under review by the District, NMWD and SCWA for the past several years.

4.4 Groundwater

Marin County is located in the midst of California's Coast Range, where the western edge of the North American Plate meets the Pacific Plate. Much of the geology of the area has been influenced by the seismic activity of the San Andreas Fault.

The ancient seafloor in the area was lifted up by both volcanic and seismic activity to form the low mountain region. The underlying bedrock unit is a jumbled mass referred to by geologists as the "Franciscan Formation, Group or Complex." Evidence of the chaotic nature of this history can be seen in many sites throughout Marin County.

Groundwater in the area is very limited as it is either found in fractures in the Franciscan Formation or in shallow alluvial deposits in valleys. In the mid-1970s the District explored possible well locations in the Headlands area just north of the Golden Gate Bridge and on Mt. Tamalpais, and found that after several days of pumping at relatively low rates the wells began to show significant drawdown. A report prepared in 1978 on the groundwater potential of the Ross Valley, the area's largest contained alluvial deposit, found that the capacity of that source was very limited and already was being utilized for landscape irrigation purposes by both public and private parties.

In recognition of the lack of groundwater supply in the area, the District Board in 1978 adopted Policy No. 3 "Wells and Other Private Water Sources." The policy encourages the use of wells for non-potable uses such as landscaping while noting that the supplies are subject to shortage during hydrologically dry periods and should only be a supplement to water service provided by the District.

Also, the District has continued to evaluate the potential for development of a groundwater supply in its service area. In 2004, the District commissioned a study to evaluate the development of groundwater in upper Lagunitas Creek. The concept was to evaluate whether leakage from the District's reservoirs along the Creek might overcome the infiltration resistance of the tight Franciscan Formation and produce a viable supply in the vicinity of the reservoirs. The study indicated that there is only a very slight chance that sufficient quantities of water would be available for development in this fractured rock zone. Therefore, groundwater is not currently or planned to be used as a water supply source by the District.

4.5 Transfer Opportunities

The District's service area is entirely within Marin County. Marin County is a peninsula surrounded on three sides by water. The physical barriers imposed by these water bodies severely limit the water transfer opportunities available to the District.

However, during the drought of the 1970s, the District made use of water transfers to augment its supplies. Emergency pipeline connections were made to SCWA north of the District and to the East Bay Municipal Utility District (EBMUD) water system to the east. Water was delivered to the District from the State Water Project through the EBMUD system and from the Russian River via the SCWA and North Marin Water District water systems.

The temporary connection with EBMUD was installed in the emergency pull-out lane of the Richmond San Rafael Bridge. It was removed from the Bridge in the early 1980s when traffic increased there, making the pipeline a safety hazard. However, the connection to the NMWD

and SCWA was improved into a permanent connection and contracts allowing delivery of water during non-emergency periods have been implemented as described in Section 4.4. Today, about 25 percent of the District's water supply is delivered via this connection.

Recently, in 2007, the District studied the feasibility of once again building a connection to the EBMUD system. CalTrans has stated that they would consider allowing the District to suspend a pipeline or pipelines from the underside of the upper deck of the Richmond-San Rafael Bridge. However, conceptual studies of this proposal indicate that the cost would be very high. The cost of a system to deliver 5 mgd and was estimated to be more than \$80 million and a 15 mgd system would cost around \$200 million. In addition, EBMUD has indicated that pumping and wheeling charges for use of their system could exceed \$2,000 per ac-ft. Even if these costs could be funded, it does not appear likely that surplus water that could be delivered by this system would be available in very dry years. Therefore, no transfers are currently planned for the future.

4.6 Desalinated Water Opportunities

In 2007, the District completed a Seawater Desalination Pilot Plant Program in San Rafael near the Richmond San Rafael Bridge. This was the second desalination pilot plant feasibility study completed by the District at this site. Both of these efforts reported the same findings:

- ◆ Potable water meeting all applicable water quality standards can be produced by desalination at this site.
- ◆ Producing desalinated water at this site will not have an adverse impact on San Francisco Bay.
- ◆ The cost of desalinated water would be higher than the cost of the potable water supplies currently available to the District.

The first pilot desalination plant program was conducted in 1990. In 1991, the District completed and certified an Environmental Impact Report (EIR) on the impacts of the facilities required, including a desalination plant in San Rafael, to provide additional water supply to the District. No significant impacts were discovered.

However, in 1991 the District electorate rejected a revenue bond measure to fund construction of those facilities. In 1992, the electorate approved a smaller water supply revenue bond that did not include funds for a desalination plant.

In 2003, the District again decided that a desalination facility in San Rafael might be needed in the future to assure adequate water supply for District residents. While the site being considered was the same location as the 1990 study, additional study was considered necessary due to the following:

- ◆ Desalination and pretreatment processes had evolved and improved significantly since 1990. Pretreatment technologies using microfiltration (which were not commercially viable in 1990) offered the potential to improve pretreatment reliability and quality and to extend the service-life of reverse osmosis membranes and improve their efficiency. These improvements could result in a reduction of both operating cost and energy requirements.
- ◆ Although the District's earlier pilot testing demonstrated that desalinated water tasted great and was free of contamination, concerns persisted about the purity of desalinated water coming from the San Francisco Bay. Compared to 1990, there are now more contaminants of concern and the ability to detect contaminants in smaller concentrations has also improved.
- ◆ Although many of the District's customers and other Bay Area citizens toured the pilot plant in 1990, many current customers had not had an opportunity to learn first hand about desalination.
- ◆ Fresh pilot test data and bioassay of the brine discharge would enhance and benefit a new EIR for the full-scale desalination plant that was being considered.

The pilot plant was a \$1.5 Million, 12 month program, conducted in 2005-06, to evaluate the viability of desalination and its environmental implications. An Engineering Report on the Pilot Program was completed and released in January 2007. Based on the data and findings from the pilot plant program, a concept-level Engineering Report was developed for full-scale desalination facilities with capacities ranging from 5 to 15 mgd. This report provided the design basis for moving ahead with an EIR describing the impacts of a full-scale project.

The draft project EIR, *Marin Municipal Water District Desalination Project*, was released in November 2007. As was the case in 1991, the EIR indicated that operation of a desalination facility would produce water meeting all applicable water quality standards and would not have an adverse impact on the environment, though construction of the intake structure and the required transmission water storage tanks would have significant temporary construction and visual impacts, respectively.

The EIR was finalized in December 2008 and certified in February 2009. A Notice of Determination was filed in August 2009. Opponents to the desalination process filed suit to overturn the project. That litigation is still in progress.

In April 2010, in the face of decreased water demand during the ongoing financial recession, work on the desalination project was put on hold. In August of 2010, the District adopted Ordinance 420, which states that the District shall not approve construction, or financing for construction, of a desalination facility unless such construction is approved by a majority of District voters, voting in an election held within the District's service area for that purpose.

As described in Sections 4.8 and 5.6.4, the District's existing water supply sources, in combination with the conservation program, are projected to be sufficient to meet the needs of the MMWD service area for the planning horizon of this UWMP. As a result, the District does not intend to pursue desalination to augment water supplies at this time.

4.7 Recycled Water Opportunities

The District started water recycling during the drought of 1976-77 when a pilot plant was commissioned for drought relief. The pilot plant demonstrated that recycled water was available when other sources were not. Increased concern about limited potable supplies led to a joint effort with the Las Gallinas Valley Sanitary District to build a permanent facility. In 1981, a 1.0 mgd direct filtration plant was completed and served 60 ac-ft/yr to nearby McInnis Park and to highway landscaping. Plans for further expansion were set back when the state water reclamation regulations (Title 22) were made more stringent. The water quality that the plant was capable of producing was no longer adequate for irrigating parks, playgrounds, and greenbelts.

In 1989, the District upgraded the recycled water facility from direct filtration to full conventional treatment and increased capacity to 2.0 mgd. With improved water quality, the District was able to expand its recycled water market. From 1990 through 1994, the distribution system was enlarged using District funds plus a \$5 million low-interest loan from the State Revolving Fund. Today, the District's recycled water system, shown in Figure 4-3, contains 25 miles of pipeline, 1.7 MG of storage, 4 pump stations, and serves about 650 ac-ft of recycled water per year through 353 service connections.

4.7.1 Pioneering New Uses for Recycled Water

Although irrigation remains the primary use (95 percent) for recycled water in the District's service area, there are virtually no large-scale irrigation accounts and no major industrial water users in the area. Therefore, the District has turned to innovation and pioneered non-traditional uses of recycled water to optimize the efficiency of the system and to keep the recycled water system growing, including the following:

- ◆ **Flushing Toilets with Recycled Water** – As a result of efforts launched in 1991, there are now 22 buildings in the District's service area that use recycled water to flush toilets and urinals. This includes the 330-bed Marin County Jail, which was the first use of recycled water in a penal institution. All new buildings in the recycled water service area are now required to be constructed with dual plumbing to use recycled water indoors as well as for landscape irrigation. Construction on the first residential condominium in California with dual plumbing to use recycled water for toilet flushing will be completed in 2011.

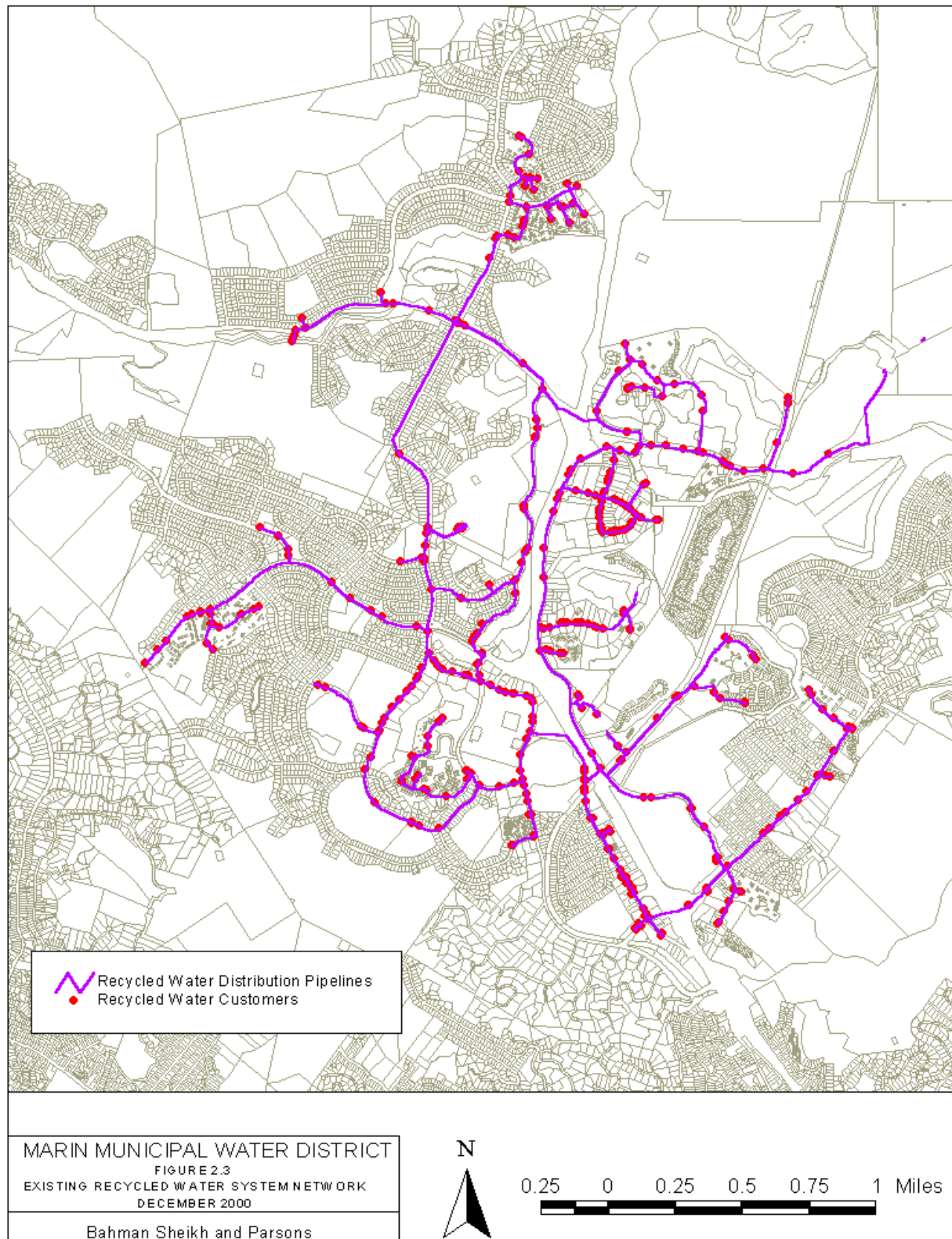


Figure 4-3. Recycled Water System

- ◆ **Car Washes with Recycled Water** – In 1995, the District was the first in California to use recycled water in a car wash. Building on that success, two new car washes were constructed to use recycled water. All new car washes in the recycled water service area are now required to use recycled water.
- ◆ **HVAC Cooling Towers with Recycled Water** – Although it required four years of negotiation to overcome regulatory concerns about *Legionella*, in 1995 the District successfully pioneered the first use of recycled water in a HVAC cooling tower. Since then, a second building has had the HVAC converted to recycled water.
- ◆ **Commercial Laundries with Recycled Water** – Although it required two years of negotiation to gain regulatory approvals, in 1998 the District was the first water district in California to convert a commercial laundry to use recycled water.

4.7.2 Legislative Accomplishments and Awards

In order to improve opportunities for water recycling in Marin and throughout California, the District has been an active advocate of legislative and regulatory issues involving recycled water. The District has taken the lead in the following areas:

- ◆ **AB 24 in 1990** – This created low-interest loans for recycled water projects.
- ◆ **AB 1698 in 1991** – This empowered public agencies to require dual plumbing in buildings.
- ◆ **California Ad Hoc Dual Plumbing Committee** – This established the first plumbing code language for constructing dual plumbed buildings.
- ◆ **CA/NV AWWA Recycled Water Retrofit Guidelines** – In a 3-year effort, the District was the primary author for these guidelines which created a user-friendly document to facilitate recycled water retrofits. This effort was endorsed by state health departments in both California and Nevada.
- ◆ **Operator Certification** – The District lead the effort in 1997 to allow either state-certified water or wastewater operators to operate recycled water plants.
- ◆ **AB 1522 in 1997** – This expanded the types of buildings that could be dual-plumbed to use recycled water indoors as well as out.
- ◆ **2002 Recycled Water Task Force** – This was a statewide effort to examine the obstacles and impediments to recycled water in California.
- ◆ **AB 1406 (Huffman) in 2007** – Authorized dual plumbing of condominiums to flush toilets with recycled water.
- ◆ **2009 California Plumbing Code** – Dual plumbing of buildings section authored by District staff.

The District, employees, and customers have received water recycling awards for their significant contributions to water recycling, including the following:

- ◆ **1993** – The District’s Water Recycling Plant received an award for Engineering Excellence from the Consulting Engineers and Land Surveyors of California.
- ◆ **1994** – The District’s Water Recycling Program won a Special Award of Merit from the WateReuse Association of California in recognition of the innovative and pioneering aspects of the program.
- ◆ **1997** – The Association of California Water Agencies named the District as a finalist in the Innovations Category of ACWA’s Clair A. Hill Water Agency Award for Excellence. This award recognized the District’s Recycled Water Demonstration Garden, recycled water training manual, and seminars for landscape professionals.
- ◆ **1998** – In recognition of District staff member, Ken Feil’s leadership in creating the Recycled Water Retrofit Guidelines, in 1998 Ken received the George A. Elliot Memorial Award from the CA-NV Section of the American Water Works Association.
- ◆ **2000** – Bob Castle received Outstanding Service Award for 2000 from the WateReuse Association.
- ◆ **2002** – The District’s Recycling Program received award for Outstanding Contribution to Sustainable Water Use from the WateReuse Association
- ◆ **2002** – District customer, Nazareth House, received award for Outstanding Recycled Water Customer for having the world’s first commercial laundry to use recycled water.
- ◆ **2009** – Bob Castle received Recycled Water Advocate of the Year Award from WateReuse in recognition of effort to add dual plumbing of buildings into the 2010 California Plumbing Code.

4.7.3 Ongoing District Water Recycling Activities

Over the past twenty years, the District has consistently expanded the use of recycled water, number of sites served, and the total amount of recycled water put to use. Figure 4-4 shows the trend in the number of sites and volume of water from 1990 to 2010. The recycled water distribution system currently serves 353 customers. The system is located in the northern part of the District’s service area from the Marin County Civic Center through Marinwood. All customers on the system are served recycled water from the District’s Las Gallinas Recycling Plant operated in conjunction with the Las Gallinas Valley Sanitary District. At this time, almost all of the potential customers along the 24 miles of existing pipeline have already been converted from potable to recycled water.

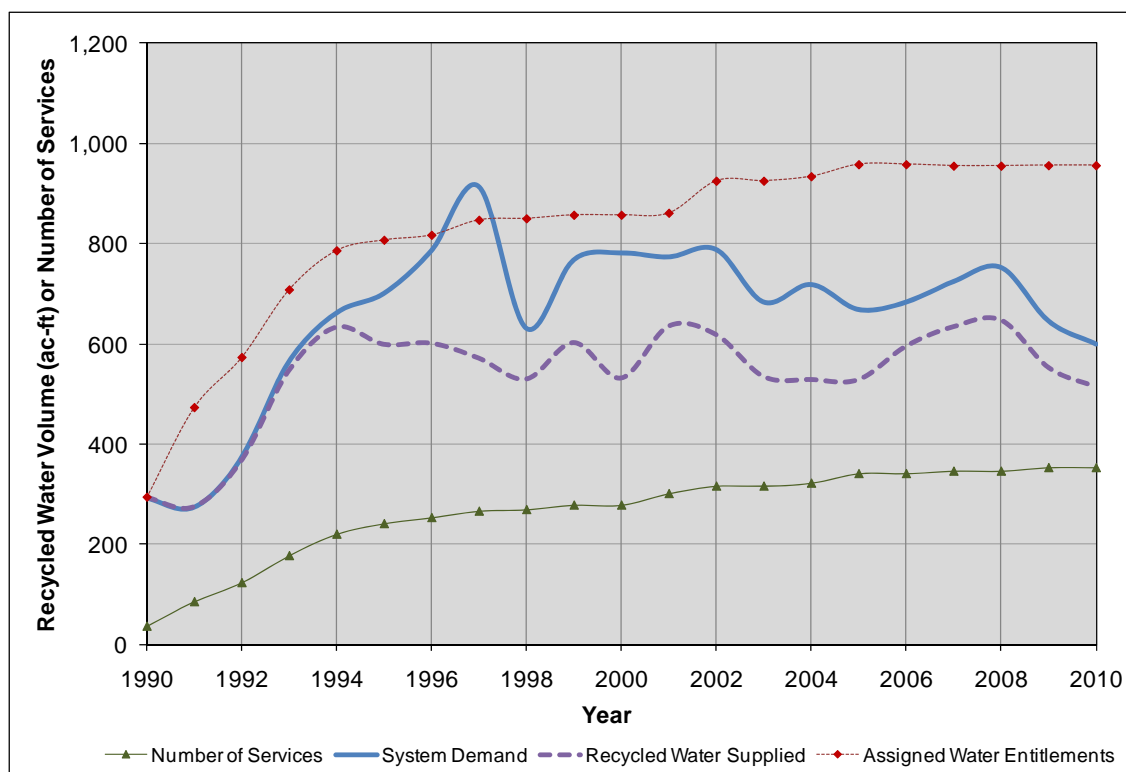


Figure 4-4. Recycled Water System Growth

As shown in Figure 4-5, unlike many areas of Southern California, Marin County experiences a relatively wet rainy season which limits the season for landscape irrigation to about 7 months of the year (April through October). The District's Las Gallinas Recycling Plant is not operated during the winter months when water demand is low. During the winter months, and other periods when the recycled water treatment plant is not producing sufficient water, the recycled water customers are supplied with potable water. For the period 2000 through 2009, the recycled system demand averaged approximately 723 ac-ft/yr. However, the actual recycled water supplied to the recycled system averaged 581 ac-ft/yr, or about 80 percent of the total demand.

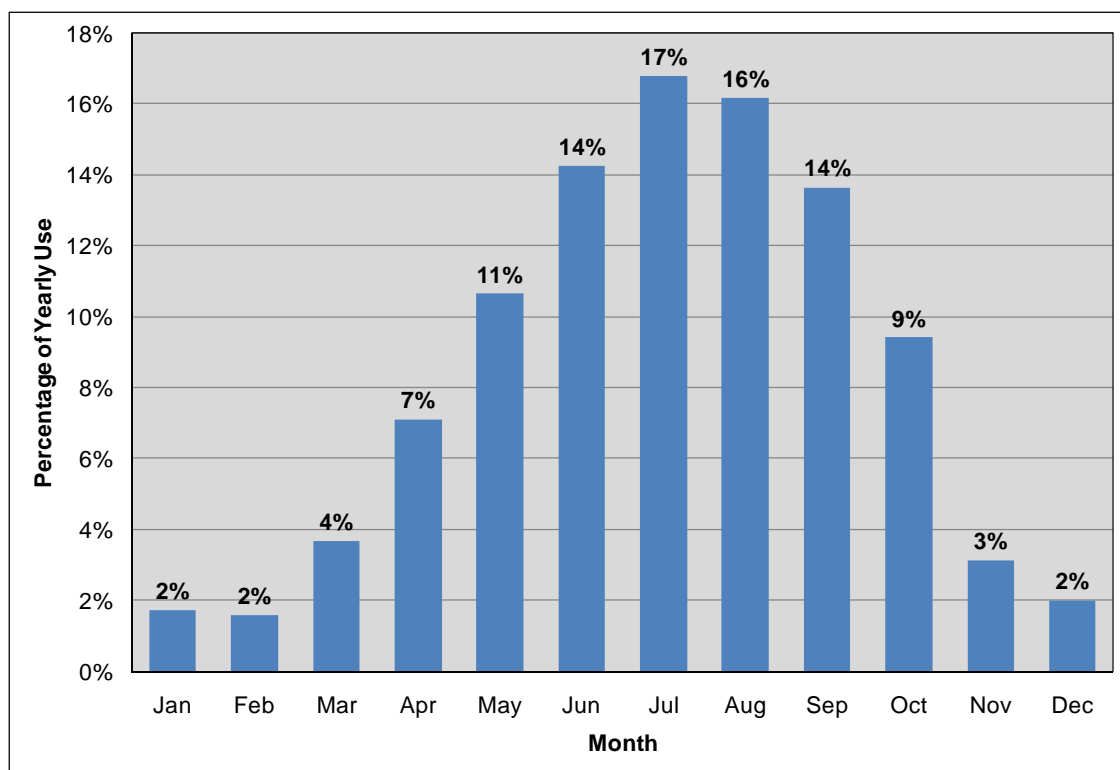


Figure 4-5. Average Recycled Water Use by Month

4.7.4 Description of Wastewater Agencies and Quantities

Within the District's service area there are thirteen wastewater agencies. A summary of these agencies is included in Table 4-4. Of these, eight are collection agencies and five have treatment facilities.

Three of the thirteen wastewater agencies utilize secondary effluent for landscape irrigation at the wastewater treatment plant. The Richardson Bay Sanitation District irrigates an adjacent park with secondary effluent. This water does not meet current recycled water regulations, but the existing practice is "grandfathered." The Sewerage Agency of Southern Marin (SASM) has a small tertiary treatment facility and irrigates an adjacent park. However, saltwater intrusion limits this operation to low tide cycles only.

Recycled water opportunities are limited by the salt levels of the source water. However, data on sodium and chloride levels is not readily available from the wastewater agencies. In order to estimate dry-weather sodium and chloride levels, the District requested 24-hour composite samples from Sanitary District #5, Sausalito-Marín City Sanitary District, and SASM.

The samples were analyzed for their sodium and chloride content. The results showed that Sanitary District No. 5 and Sausalito-Marín City Sanitary District have sodium in the 600-700 mg/L and chloride in the 1,000-1,300 mg/L range. The results from SASM were lower, with

sodium in the range of 200-300 mg/L and chloride 300-400 mg/L. As previously described, the small recycled water system which they use to irrigate an adjacent park can only be operated at low tide cycles or diluted with potable water.

Table 4-5 provides a summary of wastewater treated at each of the wastewater treatment plants. Development within Marin County is limited due to space constraints. Therefore, wastewater projections are estimated to remain steady over the planning horizon. No wastewater, beyond that currently being used as recycled water, is treated to Title 22 recycled water standards. Furthermore, no treated wastewater meeting recycled water standards is being discharged or is otherwise available for use in a recycled water project. Table 4-6 provides a summary of the volumes of treated effluent discharged.



**Table 4-4
Recycled Water — Wastewater Collection and Treatment Facilities**

Wastewater Agency	Member Agencies	Service Area	Average Dry Weather Flow (ADWF)	Collection System	Wastewater Treatment Plant	Disposal Method
Almonte Sanitary District	NA	Almonte area of Mill Valley	0.15 mgd	6 miles of Sewer Pipe	NA	Conveyance to SASM for treatment.
Alto Sanitary District	NA	Alto area of Mill Valley	0.08 mgd	2.6 miles of Sewer Pipe	NA	Conveyance to SASM for treatment.
Central Marin Sanitation Agency (CMSA)	San Rafael Sanitation District Sanitary District No. 1 Sanitary District No. 2 City of Larkspur	Central Marin Co. Ross Valley Larkspur Corte Madera San Rafael	7 mgd ¹	0.7 miles of Force Main	ADWF Capacity =10 mgd Secondary Treatment (screening, grit removal, primary clarification, trickling filters, secondary clarification, chlorination, dechlorination)	<ul style="list-style-type: none"> Deepwater Outfall to Central San Francisco Bay Limited onsite reclaimed uses
Homestead Valley Sanitary District	NA	Homestead Valley, Marin County	0.18 mgd	9.6 miles of Sewer Pipe	NA	Conveyance to SASM for treatment.
Las Gallinas Valley Sanitary District	NA	Marinwood Santa Venetia Rafael Meadows Terra Linda Lucas Valley	2.2 mgd	107 miles of Gravity Pipe 35 miles Force Main 28 Pumping Stations	ADWF Capacity = 2.92 mgd Secondary Treatment (screening, aerated grit chambers, primary clarifier, intermediate clarifiers, trickling filters, secondary clarifier, coarse media filters, chlorination, dechlorination)	<ul style="list-style-type: none"> Shallow water discharge to Miller Creek, tributary to San Pablo Bay Onsite pasture land irrigation MMWD Water Recycling Plant (Title 22 disinfected tertiary, 0.84 mgd) LGVSD's new 0.75 mgd recycled plant will be online in 20102.
Richardson Bay Sanitary District	NA	Richardson Bay	0.91 mgd	3 miles of Force Main 20 Pumping Stations	NA	<ul style="list-style-type: none"> Conveyance to SASM for treatment. Secondary Reclamation (0.07 mgd) including irrigation, dust control, hydro cleaner
San Rafael Sanitation District	NA	San Rafael	4.4 mgd	158 miles of Gravity Pipe 29 miles of Force Main 32 Pumping Stations	NA	Conveyance to CMSA for treatment.

**Table 4-4
Recycled Water — Wastewater Collection and Treatment Facilities**

Wastewater Agency	Member Agencies	Service Area	Average Dry Weather Flow (ADWF)	Collection System	Wastewater Treatment Plant	Disposal Method
Sanitary District No. 1 (Ross Valley)	NA	Kentfield, Greenbrae, Ross, San Anselmo Fairfax, Sleepy Hollow, Larkspur Murray Park, San Quentin	5 mgd	180 miles of Gravity Pipe 7 miles of Force Main 20 Pumping Stations	NA	Conveyance to CMSA for treatment.
Sanitary District No. 2 (Corte Madera)	NA	Town of Corte Madera	1.0 mgd	44.5 miles of Sewer Main 16 Pumping Stations	NA	Conveyance to CMSA for treatment.
Sanitary District No. 5 (Tiburon)	NA	Tiburon Peninsula City of Belvedere	0.734 mgd	33 miles of Gravity Pipe 5 miles of Force Main 24 Pumping Stations	<i>Main Plant</i> ADWF Capacity = 0.98 mgd Secondary Treatment (primary sedimentation, biological activated sludge, secondary sedimentation, chlorination, dechlorination) <i>Paradise Cove Facility</i> ADWF Capacity = 0.04 mgd Secondary Treatment (grinding, flow equalization, extended aeration, secondary clarification, chlorination, dechlorination)	<ul style="list-style-type: none"> • Main Plant - Effluent is combined with effluent from SASM and discharged to Raccoon Strait. • Paradise Cove - Outfall to Central San Francisco Bay.
Sausalito-Marín City Sanitary District	NA	<ul style="list-style-type: none"> • Collection and treatment for Sausalito and Marin City • Treatment under contract for Tamalpais Valley, Marin Headlands, Baker, Forts Cronkite, Barry and Muir Woods 	1.5 mgd	8 miles of Force Main 7 miles of Gravity Pipe 7 Pumping Stations	ADWF Capacity = 1.8 mgd Secondary Treatment (primary sedimentation, fixed film reactors, secondary clarifiers, rotating disk screening, sand filtration, chlorination, dechlorination)	Outfall to Central San Francisco Bay.

**Table 4-4
Recycled Water — Wastewater Collection and Treatment Facilities**

Wastewater Agency	Member Agencies	Service Area	Average Dry Weather Flow (ADWF)	Collection System	Wastewater Treatment Plant	Disposal Method
Sewerage Agency of Southern Marin (SASM)	Almonte Sanitary District Alto Sanitary District City of Mill Valley Homestead Valley Sanitary District Tamalpais Community Services District Richardson Bay Sanitary District	Southern Marin County	2.0 mgd	9 miles of Sewer Pipe 6 Pumping Stations	<i>WWTP</i> ADWF Capacity = 3.6 mgd Secondary Treatment (screening, grit removal, primary clarification, trickling filters, secondary clarification, chlorination, dechlorination) <i>Reclamation Facility</i> ADWF Capacity = 0.12 mgd (coagulation, fluid bed sand filter, disinfection)	<ul style="list-style-type: none"> Pumped to Raccoon Strait in Tiburon for deep water discharge into the San Francisco Bay (2.4 mgd) Reused for landscape irrigation at Bay Front Park and Hauke Park (0.1 mgd or 5 MG/yr).
Tamalpais Community Services District	NA	Tamalpais Valley unincorporated area	0.3 mgd	27 miles of Gravity Pipe 4 Pumping Stations	NA	<ul style="list-style-type: none"> Conveyance to SASM for treatment (7%). Conveyance to Sausalito-Marín City Sanitary District for treatment (93%).

1) The ADWF provided for CSMA is based on CSMA's effluent monitoring. The ADWF's provided for San Rafael Sanitation District, Sanitary District #1, and Sanitary District #2 are based on CSMA's influent monitoring. There is large margin of error in CSMA's influent monitoring due to low velocities in the influent pipes and sediment in the pipes resulting in a smaller effective pipe area.

Table 4-5 Recycled Water — Wastewater Collection and Treatment (ac-ft/yr)						
Type of Wastewater	2010	2015	2020	2025	2030	2035
Central Marin Sanitation Agency						
Wastewater Collected & Treated	12,800	12,800	12,800	12,800	12,800	12,800
Volume that Meets Recycled Water Standard	0	0	0	0	0	0
Las Gallinas Valley Sanitary Agency						
Wastewater Collected & Treated	2,900	2,900	2,900	2,900	2,900	2,900
Volume that Meets Recycled Water Standard	607	1,550	1,615	1,680	1,740	1,795
Sanitary District #5 (Tiburon)						
Wastewater Collected & Treated	1,100	1,110	1,110	1,110	1,110	1,110
Volume that Meets Recycled Water Standard	0	0	0	0	0	0
Sausalito Marin City Sanitary District						
Wastewater Collected & Treated	1,700	1,700	1,700	1,700	1,700	1,700
Volume that Meets Recycled Water Standard	0	0	0	0	0	0
Sewerage Agency of Southern Marin						
Wastewater Collected & Treated	3,500	3,570	3,570	3,570	3,570	3,570
Volume that Meets Recycled Water Standard	15	15	15	15	15	15

Table 4-6 Recycled Water — Non-Recycled Wastewater Disposal (ac-ft/yr)							
Method of Disposal	Treatment Level	2010	2015	2020	2025	2030	2035
CSMA Discharge to Bay	Secondary	12,800	12,800	12,800	12,800	12,800	12,800
Las Gallinas Valley Sanitary Agency Discharge to Miller Creek	Secondary	2,293	1,350	1,285	1,220	1,160	1,105
Sanitary District #5 Discharge to Bay	Secondary	1,100	1,110	1,110	1,110	1,110	1,110
Sausalito Marin City Sanitary District Discharge to Bay	Secondary	1,700	1,700	1,700	1,700	1,700	1,700
SASM Discharge to Raccoon Straits	Secondary	3,485	3,555	3,555	3,555	3,555	3,555
Total		21,378	20,515	20,450	20,385	20,325	20,270

4.7.5 Recycled Water Expansion

Further expansion of the District's Las Gallinas system is dependent on future development of nearby St. Vincent/Silvera properties or through costly expansions southward to the Peacock Gap Golf Course in San Rafael or into the service area of the Central Marin Sanitation Agency (CMSA). These expansions will only occur if their costs can be reduced through economic

participation from the sanitation agencies or by significant grants from state or federal government.

In 2009, the District's Board of Directors directed staff to pursue a diverse portfolio of water supply opportunities, which included expansion of the recycled water system to the Peacock Gap area of east San Rafael and particularly to the Peacock Gap Golf Course. This project will add another 34 recycled water users to the system and serve an additional 320 ac-ft of recycled water to offset existing potable water use. The estimated cost of this expansion would be approximately \$10 million.

The Peacock Gap Recycled Water Project will extend the District's recycled water piping from its current terminus at North San Pedro Road and Schmidt Lane along North San Pedro through China Camp State Park to the existing Peacock Gap water storage tank. The recycled water expansion is shown in Figure 4-6. The project will convert the tank from potable water to recycled water storage. About 2/3 of the potential recycled water use from this project will be at the existing Peacock Gap Golf Course. Additionally, recycled water piping will be installed in Peacock Gap to serve condominium and public landscaping. Up to approximately 8.5 miles of new piping could be installed.

As previously described, the current capacity of the Las Gallinas treatment plant is 2.0 mgd. Existing use and the Peacock Gap project will use all of the plant's current production capacity. Once the Peacock Gap project is completed some of the proposed peak day flows will exceed the plant's daily capacity and will need to be met with potable water supplied to the Peacock Gap area.

The District also prepared a preliminary design report for a second recycling plant to be located at the CMSA wastewater treatment plant. The study identified approximately 900 ac-ft of potential use in east San Rafael, on the San Quentin Peninsula, and the lower Ross Valley. The sewage collection system for CMSA has extensive and widespread saltwater intrusion that has increased dramatically since the initial planning for this project in 1989. The present salt level averages over 1,000 mg/L as chlorides, which is too high for successful irrigation of landscapes. Chloride levels over 250 mg/L are generally toxic to the typical landscape plants in this area.

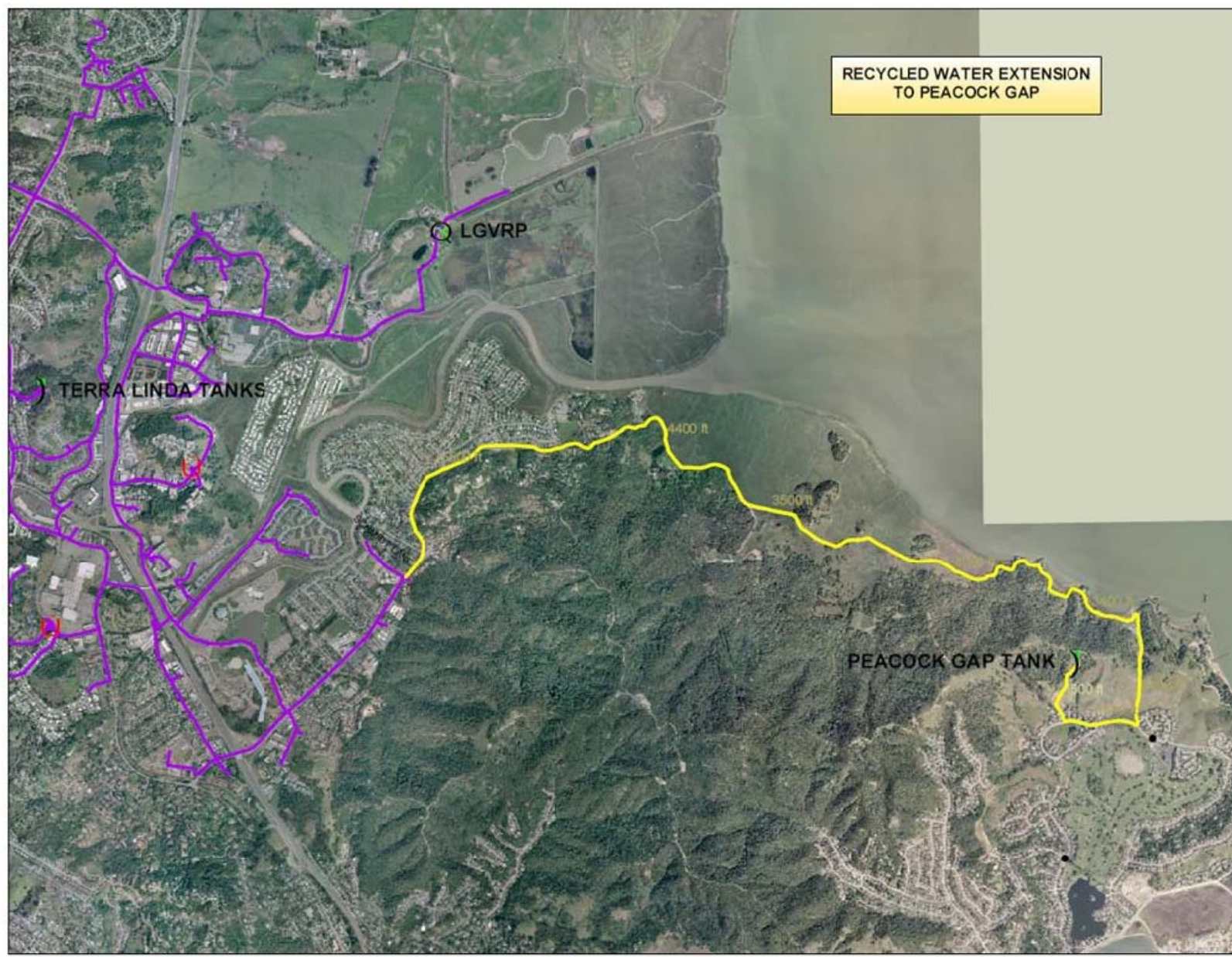


Figure 4-6. Peacock Gap Recycled Water Expansion Map

The *Salt Water Reduction Study*, completed in 1993, identified the overall condition of the bayside areas of the sewer system and areas of highest saltwater intrusion. This study also identified areas that need to be rehabilitated to maintain the sewer system integrity. Other areas would be rehabilitated to reduce salinity only. Improvements to reduce the salinity level in the sewer collection system would be in excess of \$20 million. Removing the salt through reverse osmosis from the portion of the effluent stream to be used for water recycling would cost about \$3,000 per ac-ft of the water produced. Using membrane processes to remove salt unfortunately increases the concentration of other contaminants in the wastewater discharge raising concerns about regulatory compliance. For all these reasons, a recycled water project in conjunction with CMSA has not been further advanced.

4.7.6 Recycled Water Projections

As described in the previous sections, the District has on-going plans to increase delivery capacity and expand the recycled water system to serve more potential customers. However, only existing recycled water uses and future uses that the District can rely on have been included in the recycled water projections summarized in Table 4-7.

Table 4-7 Recycled Water — Potential Future Use (ac-ft/yr)							
User Type	Description	Feasible	2015	2020	2025	2030	2035
Agricultural Irrigation	--	--	0	0	0	0	0
Landscape Irrigation	Parks, schools, medians, cemeteries, residential	Yes	391	444	444	444	444
Commercial	Building landscape, car wash	Yes	144	164	164	164	164
Golf Course Irrigation	McInnis Park Golf Center	Yes	70	273	273	273	273
Wildlife Habitat	--	--	0	0	0	0	0
Wetlands	--	--	0	0	0	0	0
Industrial Reuse	Cooling tower, other industrial	Yes	27	27	27	27	27
Dual Plumbed Buildings	Toilet/urinal flushing in commercial and residential settings	Yes	17	19	21	23	25
Groundwater Recharge	--	--	0	0	0	0	0
Seawater Barrier	--	--	0	0	0	0	0
Geothermal / Energy	--	--	0	0	0	0	0
Indirect Potable Reuse	--	--	0	0	0	0	0
Total			649	927	929	931	933
Recycled Water Production			534	763	765	766	768

4.7.7 2010 Recycled Water Use

The District's 2005 UWMP projected recycled water use in 2010 to be 710 ac-ft/yr. Actual recycled water use in 2010 was not as high as projected at 600 ac-ft/yr. This is the result of training in water efficiency to local landscape maintenance firms and the District's conservation program. Table 4-8 provides a comparison of the 2005 UWMP projection to actual 2010 use. As described elsewhere in this report, the use has decreased, but is projected to rebound by 2015.

Table 4-8 Recycled Water — 2005 UWMP Use Projection Compared to 2010 Actual (ac-ft/yr)		
Use Type	2010 Actual Use	2005 Projection for 2010 ¹
Agricultural Irrigation	0	--
Landscape Irrigation	354	--
Commercial Irrigation	131	--
Golf course Irrigation	70	--
Wildlife Habitat	0	--
Wetlands	0	--
Industrial Reuse	27	--
Groundwater Recharge	0	--
Seawater Barrier	0	--
Geothermal / Energy	0	--
Indirect Potable Reuse	0	--
Other	18	--
Total	600²	710

- 1) Total recycled water projections were provided in the 2005 UWMP and were not broken down by individual use types.
- 2) Actual recycled water production in 2010 was 514 ac-ft.

4.7.8 Methods to Encourage Recycled Water Use

The District uses a variety of incentives to encourage recycled water use. One of the more positive marketing aspects of recycled water is reliability. The droughts of 1976-77 and 1987-92 necessitated severe rationing with resultant damage to customers' landscape plantings. Recycled water is not subject to cutbacks due to drought and thereby protects a customer's investment in landscaping.

Several District policies also encourage the use of recycled water. The rate for recycled water was originally established at half of the tier 1 potable rate. It currently stands at 68 percent of the tier 1 potable rate and use above 100 percent of the service's water budget is subject to higher tier rates. The District also requires use of recycled water, where it is available, as a condition of potable water service. For existing potable water customers, the conversion to recycled water is provided without charge or fee from the District. Board Policy No. 2, included in Appendix G, contains the District policy on recycled water.

Table 4-9 provides a summary of estimated recycled water use that could be realized by implementing these methods to encourage recycled water use.

Table 4-9 Methods to Encourage Recycled Water Use (ac-ft/yr)					
Actions	Projected Results ¹				
	2015	2020	2025	2030	2035
Financial Incentives: Recycled water rates are 68 percent of the tier 1 potable water rate	325	464	465	466	467
Recycled Water Use Required as a Condition of Potable Water Service	325	464	465	466	467
Total	649	927	929	931	933

1) Projected results are estimates.

4.7.9 Recycled Water Planning

The District has thoroughly explored ways to expand water recycling. However, with few large users of non-potable water (such as golf courses and heavy industry) within the District's service area, the District's remaining water recycling options are more expensive and less feasible. As more customers improve irrigation efficiency, reduce turf areas, switch to native and drought-tolerant landscapes, and convert parks and athletic fields to artificial turf, there are fewer opportunities and lower demand for recycled water. For example, the total water entitlement of all recycled water customers connected to the recycled water system is 956 ac-ft. However, typical annual use has dropped to approximately 650 ac-ft/yr. This appears to be a by-product of the water efficiency and conservation program, especially the water efficiency training provided to local landscape maintenance firms who service both the potable and recycled water irrigation customers.

Another obstacle to water recycling in the District's service area is severe saltwater intrusion into the sewer collection systems of most of the local sanitation agencies, including that of the community's largest wastewater agency, CMSA. Rehabilitation of the sewer collection system was explored, but intrusion is so widespread that the cost to repair the sewers is much more than the cost of the water recycling project. Reducing salt in wastewater using membrane processes has also been explored, but the high cost and increased concentration of contaminants remaining in the wastewater discharge render that alternative infeasible from both a cost and regulatory perspective.

Satellite recycling plants, which can intercept sewage above the zones of saltwater intrusion and process the sewage to tertiary recycled water, appeared to be a promising avenue for enlarging the District's recycled water program. In 2001 the District conducted a study, partially funded through a grant from the DWR, to investigate the viability and cost of incorporating satellite water recycling plants into the District's distribution system. However, while the study concluded that this approach was technically feasible, it would cost over \$3,000 per ac-ft, making it prohibitively expensive.

The District continues to investigate the potential for expansion of recycled water, which, along with conservation, is a high priority in the District's vision of sustainable water resource management. While the District will continue to look for opportunities for recycled water use, it appears that the Peacock Gap expansion and incremental in-fill near our existing recycled water distribution will be the only cost-effective means of expansion. The District plans to implement the Peacock Gap Recycled Water Project by the year 2020. The projected recycled water use indicated in Table 4-7 reflects the Peacock Gap expansion of the recycled water system. In addition, the projected potable water deliveries in the years 2020 and beyond (Table 3-8 and Table 3-9) reflect the conversion of existing potable services in the Peacock Gap area to recycled water.

4.8 Future Water Supply Projects

The District's commitment to water conservation and implementation of its Water Conservation Master Plan, as well as its commitment to complying with the Water Conservation Bill of 2009 are projected to maintain the water demand at a level that can be supplied from existing water sources for the planning horizon of this UWMP. As a result, no future potable water supply projects are necessary at this time to increase the amount of available potable water supply. As described in Section 4.7, the District has plans to increase the use of recycled water within the service area including a project to provide recycled water to the Peacock Gap Golf Course.



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5.0 Water Supply Reliability and Water Shortage Contingency Planning

The UWMP Act requires that each water supplier provide an assessment of the reliability of its water supply during normal, dry, and multiple dry years. This section considers the impact on water supplies during a single extreme dry year and a multiple dry year period. In addition, a catastrophic water shortage could also occur, for example, as a result of earthquake damage, power outage, or water quality emergency. Thus, this section also presents the response to potential water shortages including catastrophic water supply interruption and drought.

5.1 Water Supply Reliability

Many factors could result in an inconsistency of the District's water supply, including limits on the amount available, water quality, climatic conditions, or a combination of these. Table 5-1 lists the District's sources of water supply and the potential factors that could impact the District's supply.

Table 5-1 Factors Resulting in Inconsistency of Supply			
Factors	Sonoma County Water Agency (Imported Water)	District Produced Surface Water	Recycled Water
Limitation Quantification	Quantity limited by contractual limits and available pipeline capacity. When pipeline capacity impacts deliveries, the District/SCWA will have to construct new conveyance facilities to supplement capacity.	None	None
Legal	Currently supply is available at a consistent level of use. Future supply increases may not be consistent due to delays in construction, approval of water rights applications, or environmental documentation.	None	None
Environmental		None	None
Water Quality	None	None	Salt-water intrusion in low-lying areas of sewer collection system.
Climatic	Drought conditions could result in a reduction of surface water supply.	Drought could result in a reduction of surface water supply.	None

Water imported from SCWA is subject to reductions during dry years. As described in the SCWA 2010 UWMP, when the Lake Sonoma water volume is less than 100,000 ac-ft before July 15, a 30 percent reduction of diversions is required, as dictated by State Water Resources Control Board's Water Rights Decision 1610. However, SCWA will work with its retail water customers to conjunctively manage Russian River and groundwater supplies to promote sustainability of these resources. SCWA is also developing plans to enhance groundwater recharge of stormwater in the Sonoma Valley, Petaluma Valley, and Santa Rosa Plain watersheds. These strategies will increase the reliability of the water supply. However, in addition to the reliability impacts associated with drought, the imported supply is also limited

by both contractual delivery limits and infrastructure capacity, as previously described in Section 4.3

Similar to the imported supply, the District's local surface water supply could also be impacted by future droughts and/or climate change. The reliability of the local surface water, as well as recycled water quality concerns are described later in this chapter.

5.2 Surface Water Operational Yield

The District defines the operational yield of the water supply system as the volume of water that can be provided to its customers in most years without depleting its reservoir storage to the point where stored water would be insufficient to meet a reduced water demand during a repeat of the most severe historical drought period (1976 through 1978). The District's operational yield is based on 81 years of estimated monthly hydrologic data, from 1928 through 2009. Using this hydrologic data and assuming that existing operational and regulatory constraints remain in effect and that Russian River water deliveries are 8,500 ac-ft/yr, a computer model was developed and used to determine how much water the District could prudently provide while enforcing mandatory water rationing, at a level of 25 percent, only once during the period of record.

Prior to 2006, the "system yield" was estimated to be 29,300 ac-ft/yr, which was predicated on the District receiving relief from instream flow requirements included in its Lagunitas Creek water rights beyond the dry year allowances included in those rights. However, the salmonids that occupy the stream below the District's reservoirs have been classified as endangered species by both State and Federal regulatory agencies. Under these conditions, and contrary to past assumptions, it is unlikely that the District will receive dry year instream flow relief beyond the 15 percent reduction allowed under SWRCB Order WR 95-17. Taking this into account, the District now estimates the "operational yield" of its water sources to be about 28,500 ac-ft/yr.

5.3 Catastrophic Supply Interruption Plan

In 1999, the District updated its emergency response plan in preparation for the advent of the year 2000 and the various possible energy shortage scenarios suggested by the Y2K event. The emergency response plan was updated again in 2004. As a result of these plans, the District has emergency response generators that can power a variety of small to medium sized pump stations throughout the service area. To accept the power from the emergency generators, the District has retrofitted most of its pump stations. The remaining stations can be bypassed to allow gas engine driven pumping or have emergency generators on site.

In addition, the District has installed large fixed generators and fuel supply systems at the Bon Tempe Water Treatment Plant and the Ignacio Water Quality Station. These facilities will allow the District to provide full winter use period water deliveries (about 1/2 summer use

demand) to its customers for a month or more in the absence of outside (PG&E) power supplies.

The District is in a seismically active area and developed a seismic strengthening program for its treatment and transmission system in 1995. The seismic strengthening is also linked to providing water for fire suppression needs following a significant seismic event and was folded into the District's Fire Flow Master Plan (FFMP). The FFMP is being implemented over a 15 year period and currently is nearing completion.

During a declared shortage, the District would issue notifications to its customers to conserve water. If the length of service interruption were to be for an extended period of time, the District would determine if the situation is localized or widespread and develop a specific plan to provide water for health and safety during the situation.

During extended periods of water shortage the District has worked with other water suppliers to provide modest amounts of water to ultimately reduce the overall level of cutback in water use required of the District's customers. Even with the additional supplies, the District requested a 57 percent use reduction of its customers during the drought of the 1970s.

5.4 Water Conservation and Dry Year Water Use Reduction Program

The District developed its rationing plan in 1999 to recognize its increased ability to import Russian River water through implementation of the initial phases of the Integrated Water Resources Management Program. The change in the rationing plan adjusted the relative levels of use reduction between customer classes to allow some additional water for landscaping in the hopes that the landscaping could be maintained in a stressed level without dying. In addition, with the ongoing implementation of conservation programs and the effects of demand hardening, a voluntary rationing program at the 10 percent level was established to preserve water in the early stage of a potential dry period and mandatory rationing is set to begin at the 25 percent rationing level. Due to the level of conservation already practiced by its customers, the District is planning its future water supply such that the depth of mandatory rationing will be no more than 25 percent with a frequency of once in 80+ years.

Water rationing is based on the amount of water in the District's reservoirs, as shown in Table 5-2. The Dry Year Water Use Reduction Program is included as Chapter 13.02.030 of the Marin Municipal Water District Code. Title 13 of the MMWD code is included in Appendix H.

5.4.1 Mandatory Rationing Allocation Plan

The District has developed an allocation Plan for mandatory rationing levels from 20% to 50%. The allocation plan includes differing use reductions by user category as shown in Table 5-3. The basic philosophy in developing these required use reductions is to generally weigh the uses involved in the various consumer classes and then to set reductions to ensure that basic health

and sanitation needs are met. Therefore, discretionary water uses, such as using potable water for irrigation, are expected to be reduced to a greater extent.

Table 5-2 Water Shortage Contingency — Water Supply Conditions and Rationing Levels		
Stage	Water Supply Conditions	% Reduction
Alert Stage (Voluntary Rationing)	Total reservoir storage is less than 50,000 ac-ft on April 1	10%
Mandatory Rationing	Total reservoir storage is less than 40,000 ac-ft on April 1	25%
Water Shortage Emergency	Total reservoir storage on December 1 is projected to be in the vicinity of, or less than 30,000 ac-ft	up to 50%

Table 5-3 Allocation Plan — Proposed Cutbacks at Different Rationing Levels					
Billing Codes	20% Rationing	25% Rationing	30% Rationing	40% Rationing	50% Rationing
Billing Code 1-5 (Residential)	25%	32%	32%	46%	55%
Billing Code 6 (Institutional)	20%	25%	30%	40%	50%
Billing Code 7 (Business)	15%	20%	25%	35%	45%
Billing Code 8 (Irrigation)	45%	50%	60%	75%	90%

5.4.2 Water Waste Prohibitions

The District has implemented on-going prohibitions to reduce water waste. There are additional prohibitions that are put into action during dry periods. Table 5-4 provides a summary of on-going and dry period prohibitions.

5.4.3 Penalties

Any customer violating the regulations and restrictions on water use set forth above shall receive a written warning for the first such violation. Upon a second violation, the customer shall receive a written warning and the District may cause a flow restrictor to be installed in the service. If a flow restrictor is placed, the cost of installation and removal shall be paid by the violator. Any willful violation occurring subsequent to the issuance of the second written warning shall constitute a misdemeanor and may be referred to the Marin County district attorney's office for prosecution. The District may also disconnect the water service. If water service is disconnected, it shall be restored only upon payment of the turn-on charge fixed by the District Board of Directors.

Appropriate rate penalties will be developed and presented to the Board at the time of rationing program implementation. In addition to financial penalties, these may include installation of flow restrictors and shut-off of service.

Table 5-4 Water Shortage Contingency — Mandatory Prohibitions	
Prohibitions	When Prohibition Becomes Mandatory
No Non-Essential Uses: <ul style="list-style-type: none"> Washing sidewalks, walkways, driveways, parking lots, and all other hard-surfaced areas by direct hosing, except to properly dispose of flammable or other dangerous liquids or substances or to prevent or eliminate materials dangerous to public health and safety. Escape of water through breaks or leaks within the consumer's plumbing or private distribution system for any substantial period of time within which such break or leak should reasonably have been discovered and corrected. It shall be presumed that a period of forty-eight hours after the consumer discovers such a leak or break, or receives notice from the District of such leak or break, whichever occurs first, is a reasonable time within which to correct such leak or break. Non-recycling decorative water fountains. 	On-Going
Restrictions on Irrigation: Irrigation shall not be conducted in a manner or to an extent that allows water to run off or overspray the areas being watered. Every consumer is required to have his/her water distribution lines and facilities under control at all times to avoid water waste.	On-Going
Restrictions on Reverse-Osmosis Units: The installation of reverse-osmosis water purifying systems not equipped with an automatic shutoff unit is prohibited.	On-Going
Prohibitions for New Connections: <ul style="list-style-type: none"> Single-pass cooling systems for air conditioning or other cooling system applications unless required for health or safety reasons; Non-recirculating systems for conveyer carwash applications. 	On-Going
Twenty-five Percent or Greater Water Use Reduction Program: Every consumer shall eliminate water wastage and non-essential use of potable water from the District in an effort to aid the District in achieving a twenty-five percent reduction in the amount of water used by all consumers in the last year in which no restrictions in water use were required.	Mandatory Rationing Stage
Additional Prohibited Nonessential Uses Applicable to All Consumers: Use of potable water for: refilling or as make-up water for decorative fountains or pools; irrigation between the hours of 11 AM and 7 PM; irrigation of new turf areas; washing of cars, boats, airplanes with hose without a shut-off nozzle; or serving water to restaurant patrons, except on request.	Mandatory Rationing Stage

5.4.4 Variances to Dry Period Regulations

Variance requests must be submitted in writing to the District and include the account name, service number, and service address.

5.4.4.1 Residential Customers

Variance requests will be considered for the following:

- ◆ Medical hardship - Requires letter from physician supporting applicant's request.
- ◆ For business use in home - Requires copy of business license.

5.4.4.2 Commercial, Institutional, and Other Uses

Requests will be considered when the customer can show that severe financial handicap will occur without additional water. The written request should include a statement addressing the following:

- ◆ What has been done to reduce consumption.
- ◆ Why is the customer unable to further reduce consumption.
- ◆ How much water the customer needs.

In granting variances, water saving retrofits or modifications may be required if deemed practical by District personnel. For example, a licensed home day care center may be required to retrofit 1.6 gallon ultra low flow toilets (ULFTs) and flow restricting faucet aerators before being granted a variance allotment.

Variances will not be granted for:

- ◆ Home businesses without a business license,
- ◆ Temporary residents (less than 6 months),
- ◆ Pets or livestock (except cattle and horses),
- ◆ Gardening or landscaping needs,
- ◆ Parks or athletic fields, or
- ◆ Normal expansion of a business or institution.

5.4.5 Water Banking

Water banking (i.e. carry over allotments from one billing period to another), will be allowed. Consumers will be allowed to bank water for one calendar year only. No carry over into subsequent years should be allowed.

5.4.6 Support Programs

Rationing will be supported by aggressive campaigns of public information, water saving retrofit incentives, and technical support.

5.4.7 Water Shortage Effects on Revenues and Expenditures

Water service is billed by the District using a four tier rate structure for water consumption and a fixed rate meter service charge. The meter service charge is based upon the size of the meter serving the customer's account. Reserve minimums have been set at a level equal to six months of District operating costs.

Predetermined storage levels, as previously described, will trigger set water use reduction goals. These reductions will have an adverse effect on revenues and available reserves. The District recognizes that operational costs often rise in time of drought because of the level of customer service activities required and increased water management costs. District ordinances specify that a voluntary water conservation program of 10 percent will automatically result in a temporary increase of water rates by 10 percent, and a mandatory rationing program of 25

percent will result in a temporary increase of water rates by 25 percent. The District does not have a Rate Stabilization Fund. The rate increases generated by water shortage plans will be coupled with the District's operating reserves to provide adequate funding to carry on essential District operations.

In the drought of the 1987-1992, the District established a five tier rate structure to encourage conservation. If necessary, a similar rate structure may be considered in future rationing periods.

5.5 Water Quality

The District is fortunate to have water of exceptionally high quality and has never exceeded a water quality regulatory limit or received a regulatory violation. Five of the seven local surface water reservoirs are located in a District-owned and protected watershed that substantially reduces the potential for contamination. The two reservoirs outside the protected watershed are located in rural areas with low population densities that are maintained by strict zoning requirements. In addition, the District has established Watershed Protection Agreements with landowners in these watersheds. Accordingly, the high water quality that the District has historically enjoyed is expected to continue into the future. There have been no instances when water quality issues have limited water supply or affected reliability.

The largest impact to water quality in the District's surface water reservoirs is algal blooms that can create taste and odor problems. Algal taste and odors are created from certain species of blue-green algae that secrete musty, earthy taste and odor compounds (Geosmin or MIB), which can be detected by sensitive humans in concentrations as low as 2 parts per trillion. This is an aesthetic problem only as there are no health concerns about Geosmin or MIB. The District manages algal blooms through lake monitoring in the summer and fall. When necessary, the species of algae that create taste and odor problems are controlled through the careful application of copper sulfate. The District has plans to perform pilot testing of activated carbon in both the powdered and granular form to test the effectiveness and cost of this additional taste and odor management tool.

As described in Section 4, the District has developed an extensive recycled water program in the Las Gallinas area. The District has investigated the feasibility of building water recycling systems in other areas as well, none of which are economically feasible without the financial participation of wastewater agencies. An additional constraint to water recycling is saltwater intrusion into low-lying areas of the sewer collection systems that renders the water too salty to use for landscape irrigation, the primary market for recycled water in the District's service area. The District's existing recycled water system is also vulnerable to salt water intrusion if an earthquake were severe enough. Most of the low-lying areas subject to saltwater intrusion are located in soil conditions that would experience differential settlement in an earthquake and allow further saltwater inflow into the sewage collection system.

A summary of the current and projected water supply impacts due to water quality is provided in Table 5-5.

Table 5-5 Water Quality — Current and Projected Water Supply Impacts (ac-ft/yr)							
Water Source	Description of Condition	2010	2015	2020	2025	2030	2035
Sonoma County Water Agency (wholesale supplier)	No issues	0	0	0	0	0	0
District Produced Surface Water	No issues	0	0	0	0	0	0
Recycled Water	Vulnerable to salt water intrusion	0	0	0	0	0	0

5.6 Drought Planning

Drought planning considers water supplies during single-dry and multiple-dry years as defined below:

- ◆ **Average Year:** Defined as the median runoff over the previous 30 years or more.
- ◆ **Single-Dry Year:** Generally considered to be the lowest annual runoff for a watershed since the water-year beginning in 1903.
- ◆ **Multiple-Dry Year:** Generally considered to be the lowest average runoff for a consecutive multiple year period (three years or more) for a watershed since 1903.

The District's projected dry year water demands are based on the hydrologic conditions presented in Table 5-6. The single driest water year in the period of record occurred in 1977. The lowest average annual multiple dry year period occurred in 1976 through 1978. The District's combined water supply reservoir storage simulated for the multiple dry year period is shown in Figure 5-1.

Table 5-6 Basis of Water Year Data	
Hydrologic Condition	Base Year(s)
Average Water Year	2008
Single-Dry Water Year	1977
Multiple-Dry Water Years	1976 - 1978

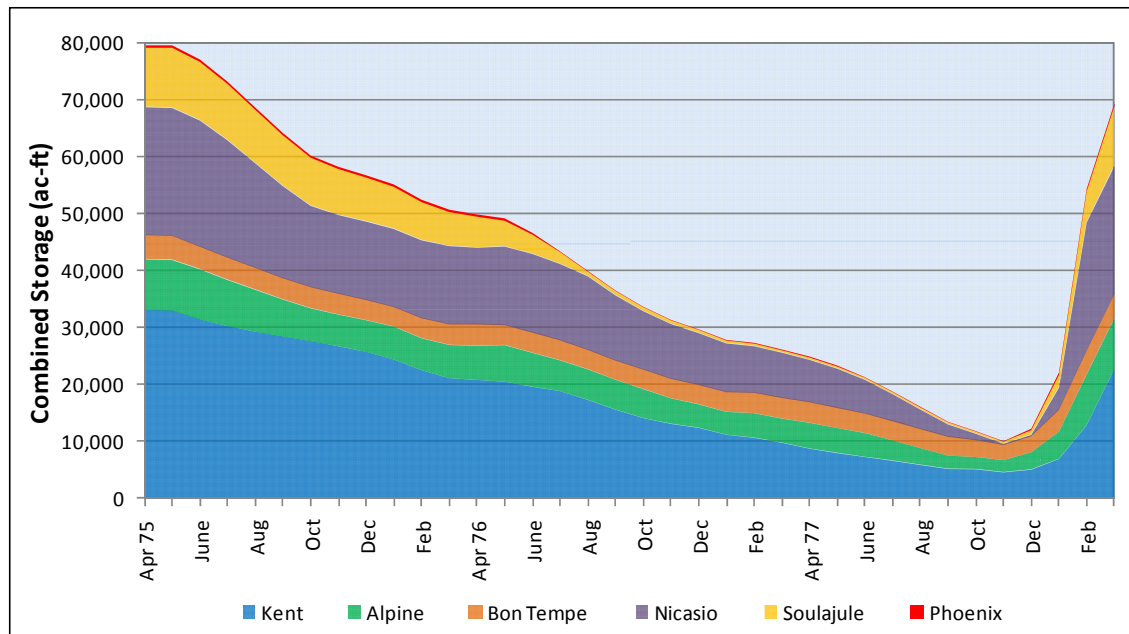


Figure 5-1. Combined Water Supply Reservoir Storage - Multiple Dry Year Period (1975 - 1978)

5.6.1 Historic Conditions - Water Supply in Normal and Dry Years

The estimated potable water supply in each of the years identified in Table 5-6 is provided in Table 5-7. The dry years were compared to normal water years, shown as a percentage of normal water year supply.

Table 5-7 Supply Reliability — Historic Conditions (ac-ft/yr)				
Average / Normal Water Year (2008)	Single Dry Water Year (1977)	Multiple Dry Water Years		
		Year 1 (1976)	Year 2 (1977)	Year 3 (1978)
28,500	26,134	25,679	21,717	26,790
Percent of Average/Normal Year	91.7%	90.1%	76.2%	94.0%

5.6.2 Minimum Water Supply over the Next Three Years

The minimum water supply available during each of the next three years (2011 - 2013) is provided in Table 5-8. Potable water supplies (imported water and surface water) are based on the driest three-year historic sequence. Recycled water is not subject to cutbacks due to drought and thereby has 100 percent reliability. Therefore, recycled water was not included in this table.

Table 5-8 Supply Reliability — Current Water Sources (ac-ft/yr)					
Water Supply Sources	Average / Normal Water Year Supply	Single Dry Year	Multiple Dry Water Year Supply		
		Year 2011	Year 2011	Year 2012	Year 2013
Sonoma County Water Agency (Wholesale Supplier)	8,500	7,600	7,600	7,150	7,400
District Produced Surface Water	20,000	18,534	18,079	14,567	19,390
Percent of Normal Year		91.7%	90.1%	76.2%	94.0%

5.6.3 Determination of Actual Water Reductions

The District uses database tools that have been integrated into the District's Systems Application Programming (SAP) system and SCADA archive system to track and report on changes in water consumption. These tools can be used to determine actual water reductions once the District issues a water alert.

5.6.4 Comparison of Supply and Demand

Table 5-9, Table 5-10, and Table 5-11 compare projected water supplies and demands under normal, single dry, and multiple dry water years. Dry year supplies have been reduced to reflect available supplies during a drought similar to the drought of record. Demands have also been reduced based on the percent reduction that would be required based on the volume in the District's storage reservoirs.

Table 5-9 Supply and Demand Comparison — Normal Year (ac-ft/yr)					
	2015	2020	2025	2030	2035
Supply Totals (from Table 4-1)	29,034	29,263	29,265	29,266	29,268
Demand Totals (From Table 3-11)	28,668	28,312	28,201	28,301	28,381
Difference	366	951	1,064	966	887
Difference as % of Supply	1.3%	3.3%	3.6%	3.3%	3.0%
Difference as % of Demand	1.3%	3.4%	3.8%	3.4%	3.1%

Table 5-10 Supply and Demand Comparison — Single Dry Year (ac-ft/yr)					
	2015	2020	2025	2030	2035
Supply Totals	26,680	26,909	26,911	26,912	26,914
Demand Totals	26,344	26,036	25,935	26,026	26,100
Difference	336	873	976	886	814
Difference as % of Supply	1.3%	3.2%	3.6%	3.3%	3.0%
Difference as % of Demand	1.3%	3.4%	3.8%	3.4%	3.1%

Table 5-11 Supply and Demand Comparison — Multiple Dry-Year Events (ac-ft/yr)						
		2015	2020	2025	2030	2035
Multiple-Dry Year First Year Supply	Supply Totals	26,160	26,366	26,367	26,369	26,370
	Demand Totals	25,830	25,509	25,409	25,499	25,571
	Difference	330	857	958	870	799
	Difference as % of Supply	1.3%	3.3%	3.6%	3.3%	3.0%
	Difference as % of Demand	1.3%	3.4%	3.8%	3.4%	3.1%
Multiple-Dry Year Second Year Supply	Supply Totals	21,845	21,574	21,489	21,565	21,626
	Demand Totals	21,845	21,574	21,489	21,565	21,626
	Difference	0	0	0	0	0
	Difference as % of Supply	0%	0%	0%	0%	0%
	Difference as % of Demand	0%	0%	0%	0%	0%
Multiple-Dry Year Third Year Supply	Supply Totals	27,292	27,507	27,509	27,510	27,512
	Demand Totals	26,948	26,613	26,509	26,603	26,678
	Difference	344	894	1,000	908	834
	Difference as % of Supply	1.3%	3.3%	3.6%	3.3%	3.0%
	Difference as % of Demand	1.3%	3.4%	3.4%	3.4%	3.1%

Based on this comparison, the District has sufficient supplies to meet the demands during normal and dry water years. This is attributed to the implementation of the aggressive conservation plan, Program 3, outlined in the District's Water Conservation Master Plan and the District's Dry Year Water Use Reduction Program.



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6.0 Demand Management Measures

Demand management measures (DMMs) are specific actions a water supplier takes to support its water conservation efforts. The UWMP Act identifies 14 DMMs that are to be evaluated in the District's UWMP. These 14 DMMs correspond to the 14 best management practices (BMPs) listed and described in the California Urban Water Conservation Council Memorandum of Understanding (CUWCC MOU) that signatory water suppliers commit to implement as part of their urban water conservation programs. Table 6-1 correlates the DMM names and the CUWCC BMP names and reorganization, and identifies the BMPs which have been implemented by the District.

Table 6-1 Demand Measurement Measures (DMMs) and Best Management Practices (BMPs)						
CUWCC BMP Organization and Names (2009 MOU)				UWMP DMMs		Implemented
Type	Category	BMP #	BMP Name	DMM #	DMM Name	
Foundational	Operations Practices	1.1.1	Conservation Coordinator	L	Water Conservation Coordinator	Yes
		1.1.2	Water Waste Prevention	M	Water Waste Prohibition	Yes
		1.1.3	Wholesale Agency Assistance Programs	J	Wholesale Agency Programs	Yes
		1.2	Water Loss Control	C	System Water Audits, Leak Detection, and Repair	Yes
		1.3	Metering with Commodity Rates for All New Connections and Retrofit of Existing Connections	D	Metering with Commodity Rates for All New Connections and Retrofit of Existing Connections	Yes
		1.4	Retail Conservation Pricing	K	Conservation Pricing	Yes
	Education Programs	2.1	Public Information Programs	G	Public Information Programs	Yes
		2.2	School Education Programs	H	School Education Programs	Yes
Programmatic	Residential	3.1	Residential Assistance Program	A	Water Survey Programs for Single-Family Residential and Multifamily Residential Customers	Yes
				B	Residential Plumbing retrofit	Yes
		3.2	Landscape Water Survey	A	Water Survey Programs for Single-Family Residential and Multifamily Residential Customers	Yes
		3.3	High-Efficiency Clothes Washing Machine Financial Incentive Programs	F	High-Efficiency Washing Machine Rebate Programs	Yes
		3.4	Water Sense Specification (WSS) Toilets	N	Residential Ultra-Low-Flush Toilet Replacement Programs	Yes
	Commercial, Industrial, and Institutional	4	Commercial, Industrial, and Institutional	I	Conservation Programs for Commercial, Industrial, and Institutional Accounts	Yes
	Landscape	5	Landscape	E	Large Landscape Conservation Programs and Incentives	Yes

Pursuant to California Water Code Division 6, Part 2.6, Section 10631(j), the Water Conservation Bill of 2009, and DWR's *Guidebook to Assist Urban Water Suppliers to Prepare a 2010 Urban Water Management Plan (UWMP)*, Part II, Section (E-5), the District, an original signatory to the CUWCC MOU, has elected to comply with the UWMP DMM's by self-certifying full compliance with the CUWCC MOU reporting requirements. A memo documenting self-certification, as well as the District's Annual Report for 2009-2010 to the CUWCC is provided in Appendix I.

The District's programs for demand management through water conservation began in 1971 when water conservation literature from the American Water Works Association was inserted into water bills. By the mid-1970s the District's programs had expanded to include retrofits of water-using fixtures and have continued to expand over the last thirty-five years.

When the District was embarking on its Integrated Water Resources Management Program in 1991, a review of water demand found that an estimated 11 percent reduction in water use had occurred during the period from 1970 to 1987 after taking into account the additional services installed during the period. A similar review took place in 1999 and found that the demand had been reduced by an estimated 25 percent during the period from 1970 to 1998.

In June 2007, the District adopted its *2007 Water Conservation Master Plan*. By reference, the Conservation Master Plan is incorporated herein.

More recently, in late 2010, the District joined with SCWA and the Water Contractors to form the Sonoma Marin Saving Water Partnership (Partnership). The Partnership allows the District, SCWA, and the Water Contractors to maximize cost-effective water conservation by identifying projects and programs that can be implemented regionally. The regional partnership commits each signatory to remain in good standing with the CUWCC, to be on track with implementing the BMPs, and to budget and spend \$15 million over 10 years for implementing water conservations programs. Since the Partnership was formed, a regional water conservation educational campaign was launched and regional conservation programs are being promoted.

7.0 Climate Change

California is addressing the causes and impacts of climate change in a number of ways. The Global Warming Solutions Act of 2006 (AB 32) identified climate change as a “serious threat to the economic well-being, public health, natural resources, and the environment of California.” Climate change and/or greenhouse gas (GHG) emissions must now be considered in city and county general plans, environmental impact reports prepared under the California Environmental Quality Act (CEQA), and integrated regional water management plans (IRWMP). The District is a member of the North Bay Watershed Association which participates in the Bay Area IRWMP.

This section describes potential water supply and demand effects related to climate change and addresses potential climate change issues and actions the District has considered in the preparation of this UWMP.

7.1 Climate Variability

The District has a Mediterranean Climate. While average rainfall on watershed lands is high, about 52 inches per year at Lake Lagunitas for its 130 period of record, it is highly variable both seasonally and from year to year. About 90 percent of annual precipitation falls in the 6 months from November through April. Annual variability is also quite high with more than 30 percent of years having rainfall totals either below 33 inches or above 72 inches. By comparison, in Birmingham, Alabama, which also has an average rainfall of about 52 inches, year to year variability is much less, with about 70 percent of years having rainfall between 45 and 61 inches.

Over the centuries this seasonal and annual precipitation variability or “natural variability” of the climate has brought out the ingenuity of both the human and animal and plant populations of these climatic zones. In California, to survive and prosper in a climate with little rainfall in the growing season, the District has constructed and operates extensive facilities to collect and store abundant winter rainfall for use in seasons and in locations where normal water resources are very limited.

Many studies have been done over the past 150 years as to the appropriate hydrologic design standards to be used for these collection and distribution facilities. Applying too stringent a standard can result in costly facilities while too lax a standard can result in frequent and damaging water shortages.

The Districts’ facilities are designed to collect and deliver a sufficient amount of water to allow the District to survive a repeat of the drought of record with an acceptable level of emergency water rationing.

While District records indicate that the drought of record in Marin County is the 1976-78 period, the rainfall pattern during 1976-78 was such that the estimated return period for the

actual runoff is quite extreme, in excess of once in 400 years. This recurrence interval is supported by a recent University of Arizona study of the correlation between Blue Oak tree growth rings and rainfall and stream flow in the Russian River watershed. These studies found that the tree ring chronologies were highly correlated with available precipitation and stream flow records from the Russian River drainage. They also state that the two year period beginning in 1976 was the driest in the 423 year period of record reconstructed using the tree ring data and that 1987-91 was the driest 5 year period.

However, the District's rainfall and stream flow records paint a somewhat different picture of the severity of the recent dry spells outside the 1976-78 design period. The worst 3 and 5 year dry periods in the record are not particularly severe, with a return frequency of less than once in 100 years. From this it appears that, while the 1976-78 period was a very unusual event, the last 130 years has not produced a particularly severe longer duration drought and that the next severe water shortage is more likely to be precipitated by a series of low runoff years and not by a repeat of the 1976-78 period.

7.2 Climate Change

The climate is changing and analysis of past records may not produce an accurate prediction of future risks. The earth is only about 10,000 years beyond its last Ice Age and surface temperatures are rising and climates are inexorably changing. In addition, recent studies indicate that human activity is exacerbating and accelerating this ongoing climate change.

In an effort to help slow the rate of climate change, in 2007 the District adopted a goal of reducing, by the year 2020, the greenhouse gas emissions attributable to its operations by 15 percent from the levels of 1990. To further attain this goal the District has installed a 200 kW photovoltaic system to power its office and shop buildings, purchased hybrid vehicles to replace gasoline vehicles in its small vehicle fleet, and contributed funds to carbon sequestration projects.

However, ongoing climate change has put into question the appropriateness of traditional methods of analyzing the reliability of water supply systems. All of the District's studies of past hydrologic conditions may be for naught if the climate in the area changes substantially from past statistical definitions.

This apparent climate change has spawned a large number of studies attempting to predict its impact on the water resources of discrete areas of the globe. For California, the general consensus up to now has been that surface temperatures will increase and that that temperature rise will increase the variability of the already quite variable climate here. Many such reports and studies are included on the California Climate Change Portal. One often cited report from 2007, whose lead author was Daniel Cayan, contains a number of possible 21st century California climates based on possible carbon emission scenarios. This study projects that northern California summertime temperatures could increase by up to 6.4 °C by the year 2100 and that winter rainfall will decrease by up to 9 percent during that period. For Coastal

Northern California, the consensus until recently has been that wet year floods will become worse and droughts will be deeper and longer, but that average rainfall would remain about the same.

Now, however, a recent study by Lorraine Flint of the US Geological Survey in Sacramento, projects that while temperatures in Coastal Northern California will increase by only about 4 °C by 2100, stream flows in the Gualala and Navarro River watersheds in the Northern California coastal region will decrease by about 35 percent over that period. If this prediction is correct, and also applies to the streams from which the District obtains its water supply, it would indicate a significant impending problem for the District, which essentially obtains all of its water supply from rainfall runoff.

7.3 Climate Change Impact on Water Resources

There is now consensus that climate change will have an impact on water resources in California. However, defining this impact in a manner sufficient to allow meaningful analysis and the subsequent development of appropriate responses has, so far, proven difficult. In the absence of better predictors of future hydrology, it becomes necessary to manage water resources by developing scenarios based on an analysis of the natural variability of the climate, tempered with a degree of conservatism to account for potential changes in water supply due to anthropogenic climate change.

Two scenarios were considered to provide analytical guidance for future water management.

First, a three-year “drought planning sequence” to assess the adequacy of water supply was considered. The sequence consists of the actual runoff during the 1976 and 1977 water years, followed by a third year where runoff was equal to the average of the 1976 and 1977 water years. Based on the District’s historical rainfall records, this sequence would have a recurrence interval of between once in 100 to 200 years. Based on the District’s more limited runoff records, its recurrence interval would be more on the order of once in 500 years.

The District has completed, but not adopted, a second theoretical exercise based on the fact that the District has not experienced a statistically significant three year drought. Indeed, the years preceding and following the two year drought of record had above normal runoff. Consequently, the District developed a three year drought with a frequency of about once in 200 years, using recent hydrologic statistics as a guide.

This drought sequence was assembled by assuming that the year preceding the actual 1976-78 drought was a year in the historic record with a below normal rainfall pattern such that the total three year runoff for the study period would be equal to a once in 200 year event.

A cursory application of these two potential climate change models to the District’s water supply system indicates that the District’s reliable water supply would decrease by 10 to 25 percent. While the District acknowledges that their drought sequences do not represent a

rigorous assessment of the impacts of climate change, consideration of these hydrologic assemblages, as opposed to the more traditional approach of designing for events that have actually occurred, is a logical, yet conservative way of considering the impacts of climate change on water resources.

The District participated in funding a study conducted in 2010 by the Pepperwood Institute and Dr. Flint of the U.S. Geological Survey, which focused on climate change impacts on temperature, precipitation, runoff, and soil moisture in the northern San Francisco Bay region. This study downscaled two of the principal global climate models, and developed four combinations of greenhouse gas emission levels and precipitation levels, to determine future trends in hydrologic parameters. The report predicts that dry seasons will be extended and that the soil climatic water deficit is projected to increase by 10 to 20 percent, thereby increasing water demand for irrigation and reducing runoff.

SCWA contracted with the USGS to produce a climate change impact analysis for the Russian River in August, 2009. Work on this study is still ongoing, but the final report is anticipated by the end of 2011.

The information in these two reports may be compelling enough to prompt the District to reanalyze their approach to climate change impact analysis as described above. This anticipated study is an example of the fact that the evolution of climate science is continuously underway and a new study will inevitably yield a more refined approach to the quantification of climate change. Thus, this plan and impact assessment methodologies will be updated in 2015 and every five years thereafter to account for changes in the science.



8.0 Completed UWMP Checklist

No.	UWMP Requirement ^a	Calif. Water Code reference	Additional clarification	UWMP location
PLAN PREPARATION				
4	Coordinate the preparation of its plan with other appropriate agencies in the area, including other water suppliers that share a common source, water management agencies, and relevant public agencies, to the extent practicable.	10620(d)(2)		Section 1.2 Table 1-1
6	Notify, at least 60 days prior to the public hearing on the plan required by Section 10642, any city or county within which the supplier provides water that the urban water supplier will be reviewing the plan and considering amendments or changes to the plan. Any city or county receiving the notice may be consulted and provide comments.	10621(b)		Section 1.2.1
7	Provide supporting documentation that the UWMP or any amendments to, or changes in, have been adopted as described in Section 10640 et seq.	10621(c)		Will be provided when changes or amendments occur
54	Provide supporting documentation that the urban water management plan has been or will be provided to any city or county within which it provides water, no later than 60 days after the submission of this urban water management plan.	10635(b)		Section 1.2.1
55	Provide supporting documentation that the water supplier has encouraged active involvement of diverse social, cultural, and economic elements of the population within the service area prior to and during the preparation of the plan.	10642		Section 1.2.2
56	Provide supporting documentation that the urban water supplier made the plan available for public inspection and held a public hearing about the plan. For public agencies, the hearing notice is to be provided pursuant to Section 6066 of the Government Code. The water supplier is to provide the time and place of the hearing to any city or county within which the supplier provides water. Privately-owned water suppliers shall provide an equivalent notice within its service area.	10642		Section 1.2.2
57	Provide supporting documentation that the plan has been adopted as prepared or modified.	10642		Section 1.3 Appendix C
58	Provide supporting documentation as to how the water supplier plans to implement its plan.	10643		Section 1.3



No.	UWMP Requirement ^a	Calif. Water Code reference	Additional clarification	UWMP location
59	Provide supporting documentation that, in addition to submittal to DWR, the urban water supplier has submitted this UWMP to the California State Library and any city or county within which the supplier provides water supplies a copy of its plan no later than 30 days after adoption. This also includes amendments or changes.	10644(a)		Section 1.3
60	Provide supporting documentation that, not later than 30 days after filing a copy of its plan with the department, the urban water supplier has or will make the plan available for public review during normal business hours	10645		Section 1.3
SYSTEM DESCRIPTION				
8	Describe the water supplier service area.	10631(a)		Section 2.1
9	Describe the climate and other demographic factors of the service area of the supplier	10631(a)		Section 2.1 Section 2.3
10	Indicate the current population of the service area	10631(a)	Provide the most recent population data possible. Use the method described in "Baseline Daily Per Capita Water Use." See Section M.	Section 2.2 Table 2-3 Table 2-4 Appendix D
11	Provide population projections for 2015, 2020, 2025, and 2030, based on data from State, regional or local service area population projections.	10631(a)	2035 and 2040 can also be provided to support consistency with Water Supply Assessments and Written Verification of Water Supply documents.	Section 2.2 Table 2-4 Appendix D
12	Describe other demographic factors affecting the supplier's water management planning.	10631(a)		Section 2.3
SYSTEM DEMANDS				
1	Provide baseline daily per capita water use, urban water use target, interim urban water use target, and compliance daily per capita water use, along with the bases for determining those estimates, including references to supporting data.	10608.20(e)		Section 3.1 Table 3-1 through Table 3-4
2	<i>Wholesalers:</i> Include an assessment of present and proposed future measures, programs, and policies to help achieve the water use reductions. <i>Retailers:</i> Conduct at least one public hearing that includes general discussion of the urban retail water supplier's implementation plan for complying with the Water Conservation Bill of 2009.	10608.36 10608.26(a)	Retailers and wholesalers have slightly different requirements	Section 1.2.2



No.	UWMP Requirement ^a	Calif. Water Code reference	Additional clarification	UWMP location
3	Report progress in meeting urban water use targets using the standardized form.	10608.40		To be provided at a later date
25	Quantify past, current, and projected water use, identifying the uses among water use sectors, for the following: (A) single-family residential, (B) multifamily, (C) commercial, (D) industrial, (E) institutional and governmental, (F) landscape, (G) sales to other agencies, (H) saline water intrusion barriers, groundwater recharge, conjunctive use, and (I) agriculture.	10631(e)(1)	Consider 'past' to be 2005, present to be 2010, and projected to be 2015, 2020, 2025, and 2030. Provide numbers for each category for each of these years.	Section 3.2 Table 3-5 through Table 3-11
33	Provide documentation that either the retail agency provided the wholesale agency with water use projections for at least 20 years, if the UWMP agency is a retail agency, OR, if a wholesale agency, it provided its urban retail customers with future planned and existing water source available to it from the wholesale agency during the required water-year types	10631(k)	Average year, single dry year, multiple dry years for 2015, 2020, 2025, and 2030.	Section 3.3 Table 3-14
34	Include projected water use for single-family and multifamily residential housing needed for lower income households, as identified in the housing element of any city, county, or city and county in the service area of the supplier.	10631.1(a)		Section 3.2.6 Table 3-13
SYSTEM SUPPLIES				
13	Identify and quantify the existing and planned sources of water available for 2015, 2020, 2025, and 2030.	10631(b)	The 'existing' water sources should be for the same year as the "current population" in line 10. 2035 and 2040 can also be provided.	Section 4.1 Table 4-1
14	Indicate whether groundwater is an existing or planned source of water available to the supplier. If yes, then complete 15 through 21 of the UWMP Checklist. If no, then indicate "not applicable" in lines 15 through 21 under the UWMP location column.	10631(b)	Source classifications are: surface water, groundwater, recycled water, storm water, desalinated sea water, desalinated brackish groundwater, and other.	Section 4.4
15	Indicate whether a groundwater management plan been adopted by the water supplier or if there is any other specific authorization for groundwater management. Include a copy of the plan or authorization.	10631(b)(1)		NA
16	Describe the groundwater basin.	10631(b)(2)		NA
17	Indicate whether the groundwater basin is adjudicated? Include a copy of the court order or decree.	10631(b)(2)		NA



No.	UWMP Requirement ^a	Calif. Water Code reference	Additional clarification	UWMP location
18	Describe the amount of groundwater the urban water supplier has the legal right to pump under the order or decree. If the basin is not adjudicated, indicate “not applicable” in the UWMP location column.	10631(b)(2)		NA
19	For groundwater basins that are not adjudicated, provide information as to whether DWR has identified the basin or basins as overdrafted or has projected that the basin will become overdrafted if present management conditions continue, in the most current official departmental bulletin that characterizes the condition of the groundwater basin, and a detailed description of the efforts being undertaken by the urban water supplier to eliminate the long-term overdraft condition. If the basin is adjudicated, indicate “not applicable” in the UWMP location column.	10631(b)(2)		NA
20	Provide a detailed description and analysis of the location, amount, and sufficiency of groundwater pumped by the urban water supplier for the past five years	10631(b)(3)		NA
21	Provide a detailed description and analysis of the amount and location of groundwater that is projected to be pumped.	10631(b)(4)	Provide projections for 2015, 2020, 2025, and 2030.	NA
24	Describe the opportunities for exchanges or transfers of water on a short-term or long-term basis.	10631(d)		Section 4.5
30	Include a detailed description of all water supply projects and programs that may be undertaken by the water supplier to address water supply reliability in average, single-dry, and multiple-dry years, excluding demand management programs addressed in (f)(1). Include specific projects, describe water supply impacts, and provide a timeline for each project.	10631(h)		Section 4.8
31	Describe desalinated water project opportunities for long-term supply, including, but not limited to, ocean water, brackish water, and groundwater.	10631(i)		Section 4.6
44	Provide information on recycled water and its potential for use as a water source in the service area of the urban water supplier. Coordinate with local water, wastewater, groundwater, and planning agencies that operate within the supplier's service area.	10633		Section 4.7
45	Describe the wastewater collection and treatment systems in the supplier's service area, including a quantification of the amount of wastewater collected and treated and the methods of wastewater disposal.	10633(a)		Section 4.7.4 Table 4-4



No.	UWMP Requirement ^a	Calif. Water Code reference	Additional clarification	UWMP location
46	Describe the quantity of treated wastewater that meets recycled water standards, is being discharged, and is otherwise available for use in a recycled water project.	10633(b)		Section 4.7.4 Table 4-4
47	Describe the recycled water currently being used in the supplier's service area, including, but not limited to, the type, place, and quantity of use.	10633(c)		Section 4.7.6
48	Describe and quantify the potential uses of recycled water, including, but not limited to, agricultural irrigation, landscape irrigation, wildlife habitat enhancement, wetlands, industrial reuse, groundwater recharge, indirect potable reuse, and other appropriate uses, and a determination with regard to the technical and economic feasibility of serving those uses.	10633(d)		Section 4.7.6 Table 4-7
49	The projected use of recycled water within the supplier's service area at the end of 5, 10, 15, and 20 years, and a description of the actual use of recycled water in comparison to uses previously projected.	10633(e)		Section 4.7.7 Table 4-8
50	Describe the actions, including financial incentives, which may be taken to encourage the use of recycled water, and the projected results of these actions in terms of acre-feet of recycled water used per year.	10633(f)		Section 4.7.8 Table 4-9
51	Provide a plan for optimizing the use of recycled water in the supplier's service area, including actions to facilitate the installation of dual distribution systems, to promote recirculating uses, to facilitate the increased use of treated wastewater that meets recycled water standards, and to overcome any obstacles to achieving that increased use.	10633(g)		Section 4.7.9
WATER SHORTAGE RELIABILITY AND WATER SHORTAGE CONTINGENCY PLANNING ^b				
5	Describe water management tools and options to maximize resources and minimize the need to import water from other regions.	10620(f)		Section 1.1
22	Describe the reliability of the water supply and vulnerability to seasonal or climatic shortage and provide data for (A) an average water year, (B) a single dry water year, and (C) multiple dry water years.	10631(c)(1)		Section 5.6 Table 5-6 Table 5-7
23	For any water source that may not be available at a consistent level of use - given specific legal, environmental, water quality, or climatic factors - describe plans to supplement or replace that source with alternative sources or water demand management measures, to the extent practicable.	10631(c)(2)		Section 5.1 Table 5-1
35	Provide an urban water shortage contingency analysis that specifies stages of action, including up to a 50-percent water supply reduction, and an outline of specific water supply conditions at each stage	10632(a)		Section 5.4 Table 5-2



*Marin Municipal Water District
2010 Urban Water Management Plan*

No.	UWMP Requirement ^a	Calif. Water Code reference	Additional clarification	UWMP location
36	Provide an estimate of the minimum water supply available during each of the next three water years based on the driest three-year historic sequence for the agency's water supply.	10632(b)		Section 5.6.2 Table 5-8
37	Identify actions to be undertaken by the urban water supplier to prepare for, and implement during, a catastrophic interruption of water supplies including, but not limited to, a regional power outage, an earthquake, or other disaster.	10632(c)		Section 5.3 and Section 5.4
38	Identify additional, mandatory prohibitions against specific water use practices during water shortages, including, but not limited to, prohibiting the use of potable water for street cleaning.	10632(d)		Section 5.4.2 Table 5-4
39	Specify consumption reduction methods in the most restrictive stages. Each urban water supplier may use any type of consumption reduction methods in its water shortage contingency analysis that would reduce water use, are appropriate for its area, and have the ability to achieve a water use reduction consistent with up to a 50 percent reduction in water supply.	10632(e)		Section 5.4.1
40	Indicated penalties or charges for excessive use, where applicable.	10632(f)		Section 5.4.3
41	Provide an analysis of the impacts of each of the actions and conditions described in subdivisions (a) to (f), inclusive, on the revenues and expenditures of the urban water supplier, and proposed measures to overcome those impacts, such as the development of reserves and rate adjustments.	10632(g)		Section 5.4.7
42	Provide a draft water shortage contingency resolution or ordinance.	10632(h)		Appendix HG
43	Indicate a mechanism for determining actual reductions in water use pursuant to the urban water shortage contingency analysis.	10632(i)		Section 5.6.3
52	Provide information, to the extent practicable, relating to the quality of existing sources of water available to the supplier over the same five-year increments, and the manner in which water quality affects water management strategies and supply reliability	10634	For years 2010, 2015, 2020, 2025, and 2030	Section 5.5



No.	UWMP Requirement ^a	Calif. Water Code reference	Additional clarification	UWMP location
53	Assess the water supply reliability during normal, dry, and multiple dry water years by comparing the total water supply sources available to the water supplier with the total projected water use over the next 20 years, in five-year increments, for a normal water year, a single dry water year, and multiple dry water years. Base the assessment on the information compiled under Section 10631, including available data from state, regional, or local agency population projections within the service area of the urban water supplier.	10635(a)		Section 5.6.4 Table 5-9 through Table 5-11
DEMAND MANAGEMENT MEASURES				
26	Describe how each water demand management measures is being implemented or scheduled for implementation. Use the list provided.	10631(f)(1)	Discuss each DMM, even if it is not currently or planned for implementation. Provide any appropriate schedules.	Section 6.0
27	Describe the methods the supplier uses to evaluate the effectiveness of DMMs implemented or described in the UWMP.	10631(f)(3)		Section 6.0 Appendix I
28	Provide an estimate, if available, of existing conservation savings on water use within the supplier's service area, and the effect of the savings on the ability to further reduce demand.	10631(f)(4)		Submitting CUWCC annual report
29	Evaluate each water demand management measure that is not currently being implemented or scheduled for implementation. The evaluation should include economic and non-economic factors, cost-benefit analysis, available funding, and the water suppliers' legal authority to implement the work.	10631(g)	See 10631(g) for additional wording.	Submitting CUWCC annual report
32	Include the annual reports submitted to meet the Section 6.2 requirements, if a member of the CUWCC and signer of the December 10, 2008 MOU.	10631(j)	Signers of the MOU that submit the annual reports are deemed compliant with Items 28 and 29.	Section 6.0 Appendix I

^a The UWMP Requirement descriptions are general summaries of what is provided in the legislation. Urban water suppliers should review the exact legislative wording prior to submitting its UWMP.

^b The Subject classification is provided for clarification only. It is aligned with the organization presented in Part I of this guidebook. A water supplier is free to address the UWMP Requirement anywhere with its UWMP, but is urged to provide clarification to DWR to facilitate review.



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APPENDIX A

City and County Notification Letters



MARIN MUNICIPAL WATER DISTRICT

220 Nellen Avenue Corte Madera CA 94925-1169
www.marinwater.org

Notice of Preparation

Marin Municipal Water District's 2010 Urban Water Management Plan

This notice is being sent to encourage public involvement. In compliance with the Urban Water Management Planning Act, the Marin Municipal Water District (MMWD) is preparing its 2010 Urban Water Management Plan (UWMP). This planning effort is being conducted to ensure that adequate water supplies are available to meet existing and future water demands in MMWD's service area. The UWMP is updated every 5 years.

The UWMP will provide an overview of MMWD's water deliveries and uses, water supply sources, and demand management measures. Additionally, the 2010 UWMP will incorporate MMWD's plans for achieving the water conservation practices needed to achieve the goal of reducing per capita potable water consumption statewide by 20% by 2020 in accordance with the Water Conservation Bill of 2009.

A public hearing will be held to hear comments on the UWMP in June 2011. A draft UWMP will be released two weeks before the public hearing. Adoption of the UWMP is expected in June 2011. Hearing date information, along with the draft UWMP, will be posted online at www.marinwater.org. If you have questions regarding the UWMP please contact Jon LaHaye at (415) 945-1589 or email at jlahaye@marinwater.org.

City of Belvedere

450 San Rafael Avenue
Belvedere, CA 94920
George J. Rodericks, City Manager
435-3838 (FAX 435-0430)

Town of Corte Madera

300 Tamalpais Drive
(P.O. Box no longer in use)
Corte Madera, CA 94925-0159
David Bracken, Town Manager
927-5050 (FAX 927-5087)

Town of Fairfax

142 Bolinas Road
Fairfax, CA 94930
Michael Rock, Town Manager
453-1584 (FAX 507-4104)

City of Larkspur

400 Magnolia Avenue
Larkspur, CA 94939
David Schwarz, City Manager
927-5018 (FAX 927-5022)

Marin County Administrator

Matthew Hymel, Administrator
3501 Civic Center Drive, Room 325
San Rafael, CA 94903
499-6358 (FAX 507-4104)

City of Mill Valley

26 Corte Madera Avenue
Mill Valley, CA 94941
James McCann, City Manager
388-4033 (FAX 381-1736)

City of Novato

75 Rowland Way #200
Novato, CA 94945-5054
Michael Frank, City Manager
899-8900 (FAX 899-8213)

Town of Ross

Town Hall
P. O. Box 320
Ross, CA 94957
Gary Broad, Town Manager
453-1453 Ext 107 (FAX 453-1950)

Town of San Anselmo

525 San Anselmo Avenue
San Anselmo, CA 94960
Debbie Stutsman, Town Administrator
258-4600 (FAX 454-4683, 459-2477)

City of San Rafael

1400 Fifth Avenue
P. O. Box 151560
San Rafael, CA 94915-1560
Nancy Mackle, City Manager
485-3070 (FAX 459-2242)

City of Sausalito

420 Litho Street
(P.O. Box no longer in use)
Sausalito, CA 94965
Adam Politzer, City Manager
289-4133 (FAX 339-2256)

Town of Tiburon

1505 Tiburon Boulevard
Tiburon, CA 94920
Peggy Curran, Town Manager
435-7373 (FAX 435-2438)

Chris DeGabriele, General Manager

North Marin Water District
999 Rush Creek Pl
Novato CA 94945

Grant David

Sonoma County Water Agency
404 Aviation Blvd
Santa Rosa CA 95403



220 Nellen Avenue Corte Madera CA 94925-1169
www.marinwater.org

NOTICE OF PUBLIC HEARING 2010 URBAN WATER MANAGEMENT PLAN

A public hearing before the Board of Directors of the Marin Municipal Water District for the purpose of receiving comments on the 2010 Urban Water Management Plan (UWMP) is scheduled for:

**7:30 pm, Wednesday, July 6, 2011
MMWD Board Room
220 Nellen Avenue, Corte Madera, CA**

The UWMP is required by the Urban Water Management Planning Act, sections 10610 through 10656 of the California Water Code. The UWMP Act requires that urban water suppliers (i.e. municipal water suppliers providing water for municipal purposes to more than 3,000 customers or supplying more than 3,000 acre-feet of water annually) prepare and adopt Urban Water Management Plans (UWMPs) which report, describe, and evaluate water deliveries and uses, water supply sources, efficient water uses, and demand management measures.

The UWMP may be reviewed at the following locations:

Marin Municipal Water District
220 Nellen Avenue, Corte Madera

On MMWD's website: www.marinwater.org

You are invited to provide oral and written comments on the UWMP at the public hearing. If you can not attend, you are encouraged to submit written comments prior to the public hearing. Comments and questions may be directed to:

Jon LaHaye, Principal Engineer
Marin Municipal Water District
220 Nellen Avenue
Corte Madera, CA 94925
415-945-1589

For more information visit MMWD's website at www.marinwater.org.



APPENDIX B

Public Hearing Notice



MARIN MUNICIPAL WATER DISTRICT

220 Nellen Avenue Corte Madera CA 94925-1169
www.marinwater.org

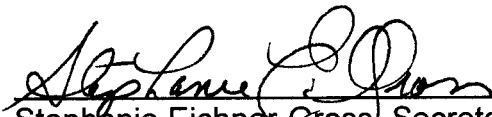
June 20, 2011

**NOTICE OF PUBLIC HEARING BY THE BOARD OF DIRECTORS OF
MARIN MUNICIPAL WATER DISTRICT
TO CONSIDER THE ADOPTION OF ITS 2010 URBAN WATER
MANAGEMENT PLAN**

NOTICE IS HEREBY GIVEN that the Board of Directors of Marin Municipal Water District will hold a public hearing at a regularly scheduled meeting commencing at 7:30 p.m. on the 6TH day of July 2011 in the District's Board Room, 220 Nellen Avenue, Corte Madera, California, to consider the adoption of its 2010 Urban Water Management Plan.

The Urban Water Management Planning Act, Water Code Section 10610 et seq., mandates that every urban supplier of water providing water for municipal purposes to more than 3,000 customers or supplying more than 3,000 acre-feet of water annually, prepare an Urban Water Management Plan, the primary objective of which is the management of urban water demands and efficient use of water. Copies of the 2010 Urban Water Management Plan are available for review and purchase at the District's office at 220 Nellen Avenue, Corte Madera, during normal business hours. This document is also available for review at the District's website: www.marinwater.org.

You are invited and encouraged to submit comments regarding any aspect of this matter in writing or verbally at the public hearing. Written comments may be mailed to Jon LaHaye, Marin Municipal Water District, 220 Nellen Avenue, Corte Madera, CA, or emailed to: jlahaye@marinwater.org. For further details on this matter or to review a copy of the 2010 Urban Water Management Plan, please contact Stephanie Eichner-Gross, Secretary to the Board of Directors, MMWD, 220 Nellen Avenue, Corte Madera, California, at (415) 945-1448.


Stephanie Eichner-Gross, Secretary
Board of Directors

Marin Independent Journal

150 Alameda del Prado
 PO Box 6156
 Novato, California 94948-1535
 (415) 382-7335
 legals@marinij.com

MARIN MUNICIPAL WATER
 ATTN: ACCOUNTS PAYABLE, 220 NELLEN AVE
 CORTE MADERA CA 94925-1102

**PROOF OF PUBLICATION
 (2015.5 C.C.P.)**

**STATE OF CALIFORNIA
 County of Marin**

FILE NO. UWMP2010-0004043478

I am a citizen of the United States and a resident of the County aforesaid. I am over the age of eighteen years, and not a party to or interested in the above matter. I am the principal clerk of the printer of the MARIN INDEPENDENT JOURNAL, a newspaper of general circulation, printed and published daily in the County of Marin, and which newspaper has been adjudged a newspaper of general circulation by the Superior Court of the County of Marin, State of California, under date of FEBRUARY 7, 1955, CASE NUMBER 25566; that the notice, of which the annexed is a printed copy (set in type not smaller than nonpareil), has been published in each regular and entire issue of said newspaper and not in any supplement thereof on the following dates, to-wit:

6/20/2011, 6/26/2011

I certify (or declare) under the penalty of perjury that the foregoing is true and correct.

Dated this 27th day of June, 2011.

Donna Lajarus

Signature

PROOF OF PUBLICATION

Legal No.

0004043478

June 20, 2011

NOTICE OF PUBLIC HEARING BY THE BOARD OF DIRECTORS OF MARIN MUNICIPAL WATER DISTRICT TO CONSIDER THE ADOPTION OF ITS 2010 URBAN WATER MANAGEMENT PLAN

NOTICE IS HEREBY GIVEN that the Board of Directors of Marin Municipal Water District will hold a public hearing at a regularly scheduled meeting commencing at 7:30 p.m. on the 6TH day of July 2011 in the District's Board Room, 220 Nellen Avenue, Corte Madera, California, to consider the adoption of its 2010 Urban Water Management Plan.

The Urban Water Management Planning Act, Water Code Section 10610 et seq., mandates that every urban supplier of water providing water for municipal purposes to more than 3,000 customers or supplying more than 3,000 acre-feet of water annually, prepare an Urban Water Management Plan, the primary objective of which is the management of urban water demands and efficient use of water. Copies of the 2010 Urban Water Management Plan are available for review and purchase at the District's office at 220 Nellen Avenue, Corte Madera, during normal business hours. This document is also available for review at the District's website: www.marinwater.org.

You are invited and encouraged to submit comments regarding any aspect of this matter in writing or verbally at the public hearing. Written comments may be mailed to Jon Lahaye, Marin Municipal Water District, 220 Nellen Avenue, Corte Madera, CA, or emailed to: lahaye@marinwater.org. For further details on this matter or to review a copy of the 2010 Urban Water Management Plan, please contact Stephanie Eichner-Gross, Secretary to the Board of Directors, MMWD, 220 Nellen Avenue, Corte Madera, California, at (415) 945-1448.

/s/
 Stephanie Eichner-Gross,
 Secretary Board of Directors
 NO.1015 JUNE 20, 26, 2011

APPENDIX C

Resolution Adopting UWMP

MARIN MUNICIPAL WATER DISTRICT

RESOLUTION NO. 8059

**RESOLUTION OF THE BOARD OF DIRECTORS
OF THE MARIN MUNICIPAL WATER DISTRICT
ADOPTING AND DIRECTING THE FILING OF THE DISTRICT'S 2010 URBAN
WATER MANAGEMENT PLAN**

WHEREAS, the California Legislature enacted Assembly Bill 797 during the 1983-1984 Regular Session of the California Legislature (Water Code Section 10610 et. seq.), known as the Urban Water Management Planning Act, and as amended subsequently, which mandates that every urban supplier of water providing water for municipal purposes to more than 3,000 customers or supplying more than 3,000 acre-feet of water annually, prepare an Urban Water Management Plan, the primary objective of which is to plan for the conservation and efficient use of water; and

WHEREAS, AB 797 requires that the Plan be adopted, after public review and hearing, and filed with the California Department of Water Resources within thirty days of adoption; and

WHEREAS, AB 797 and amendments require that the Plan be periodically reviewed at least once every five years, and that the urban water supplier shall make any amendments or changes to its plan which are indicated by the review; and

WHEREAS, subsequent to the publication of the Draft 2010 Urban Water Management Plan errors were found and the revisions included in the Errata Sheet dated June 29, 2011 shall be incorporated into the Final 2010 Urban Water Management Plan; and

WHEREAS, the District is an urban supplier of water providing water to a population of about 190,000 through about 61,000 services, and has therefore prepared and circulated for public review a Draft 2010 Urban Water Management Plan, in compliance with the requirements of AB 797 and amendments, and a properly noticed public hearing regarding the Draft Plan was held by the District's Board on July 6, 2011, and a Final Plan approved; and

WHEREAS, the District published a notice on the public hearing in the Marin Independent Journal on June 20, 2011;

NOW, THEREFORE, BE IT RESOLVED by the Board of Directors of the Marin Municipal Water District as follows:

1. The 2010 Urban Water Management Plan is hereby adopted and ordered filed with the District Secretary;
2. The General Manager is hereby authorized and directed to file the 2010 Plan with the California Department of Water Resources, Statewide Integrated Water Management Water Use and Efficiency Branch, P. O. Box 942836, Sacramento, CA 94236-0001, Attention: Coordinator, Urban Water Management Plans, no later than thirty days from the approval of the Plan;
3. The General Manager is hereby authorized and directed to continue the implementation of programs as detailed in the adopted 2010 Urban Water Management Plan.

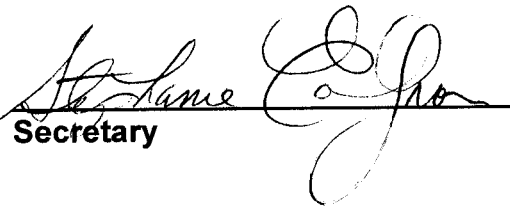
PASSED AND ADOPTED this 6th day of July 2011 by the following vote of the Board.

AYES: Directors Behar, Gibson, Koehler, Quintero and Russell

NOES: None

ABSENT: None

ATTEST:


Secretary


President, Board of Directors

APPENDIX D

MMWD Service Area Population Projection



MMWD MEMORANDUM

DATE: October 8, 2010
TO: Mike Ban
FROM: Jon LaHaye
SUBJECT: UWMP 2010 – MMWD Service Area Population Projection

The California Urban Water Management Planning Act requires urban water suppliers to provide projections of service area population in five-year increments to 20 years or as far as data is available. The projected population is a key element of water management planning and affects both estimates of future water needs, as well as, the potential savings from conservation measures. The projected population estimates are to be produced using federal, state and local agency reports and projections.

The Association of Bay Area Governments (ABAG) is the official comprehensive planning agency for the San Francisco Bay region. ABAG produces updated population forecasts (projections) every 2 years for each of the nine Bay Area Counties by city jurisdiction, subregional study area and census tract. The most recent ABAG projection was published in 2009. The 2009 projection includes population estimates in five-year increments from 2000 through 2035. The population forecasts can change appreciably from projection to projection. ABAG has been progressively lowering the population estimates in its last few projections. Figure 1 provides a comparison of 2005, 2007 and 2009 population projections for Marin County.

As part of the UWMP update the District obtained a copy of the ABAG Projections 2009 for Marin County. The District boundary was overlaid upon a map of the census tracts to determine which tracts are located within the District service area. The census tracts/service area map is attached as Figure 2. Fortunately the census tract and MMWD boundaries line up pretty well for the most part. In most cases, the populations of the census tracts were either 100% within or outside of the MMWD service area. The only exception being census tract 131000 which includes the coastal areas of Marin Headlands and Muir Beach. The Marin Headlands area is served by the District. However, Muir Beach is not within the District boundary. For census tract 131000, 50% percent of the population was assumed to be within the District. The attached Figure 3 provides a tabulation of the population projections by census tract, as well as, population estimates for the MMWD service area.

The ABAG 2009 projection for 2030 Marin County population is substantially lower (4.6%) than the population projected in 2005. This results in lower projected populations within the District service area. In previous UWMPs, the District has produced service area population estimates based on the subregional study area projections. Subregional study areas (SSA) are defined using LAFCO sphere of influence boundaries.

As a comparison, service area population estimates were produced using the SSA 2005, 2007 and 2009 ABAG projections. As in the countywide projections, the District service area estimates

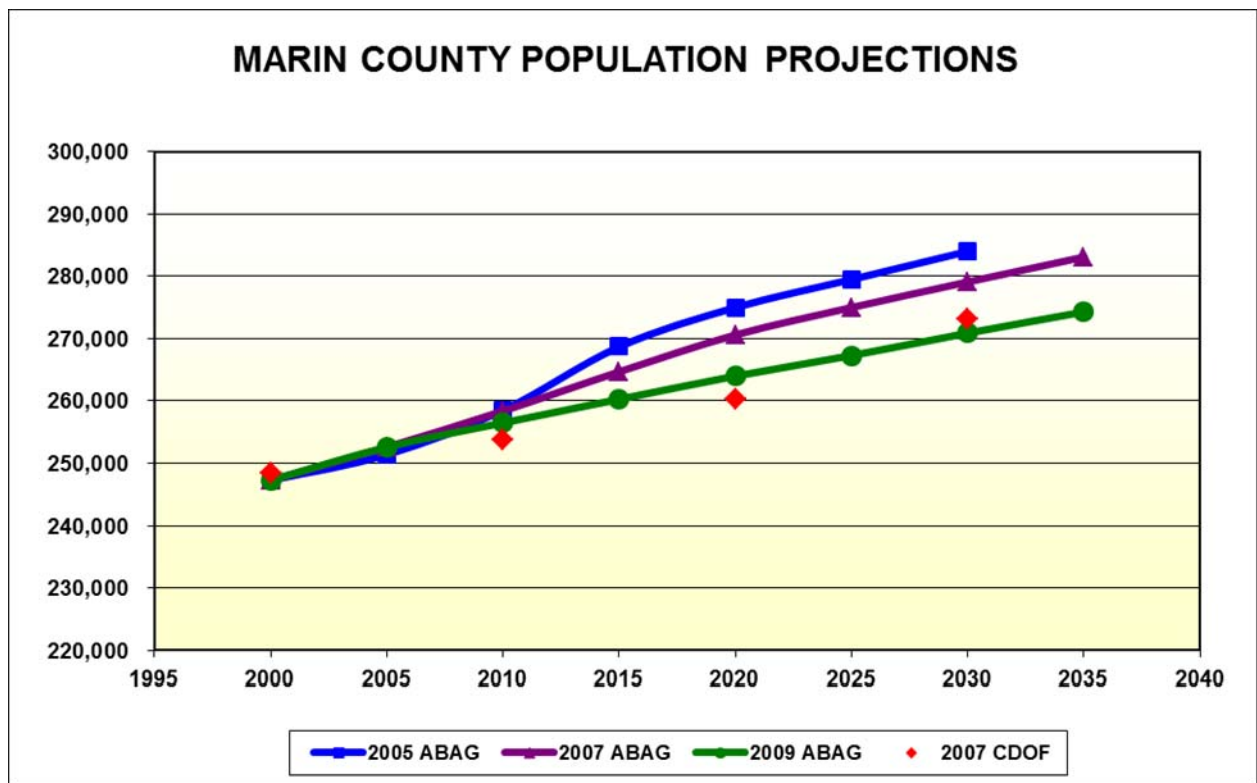
declined by about 5 percent between the 2005 and 2009 projections. In order to reconcile for the marked variations in the projections, it is recommended that an average of the three projections be adopted for use in the preparation of the 2010 UWMP. The attached Figure 4 provides comparisons of projected MMWD service area population based on the ABAG SSA projections and the population estimates included in the District's 2000 and 2005 UWMP.

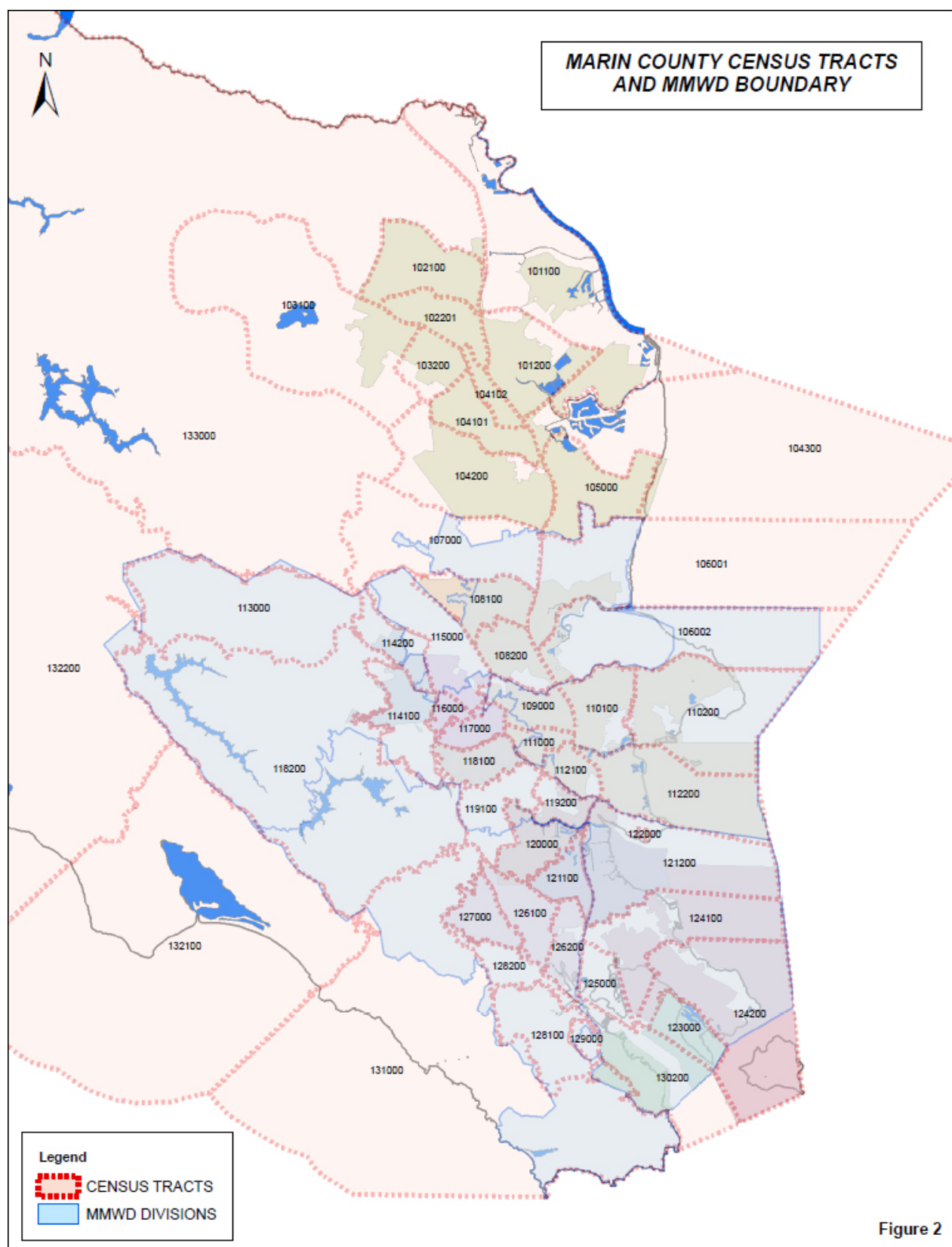
UWMP 2010 Population Projection
Figure 1

COMPARISON OF POPULATION PROJECTIONS					
YEAR	MARIN COUNTY POPULATION				
	2005 ABAG	2007 ABAG	2009 ABAG	2007 CDOF	AVERAGE
2000	247,289	247,289	247,289	248,449	247,579
2005	251,400	252,600	252,600		252,200
2010	258,500	258,400	256,500	253,682	256,771
2015	268,700	264,700	260,300		264,567
2020	275,000	270,600	264,000	260,305	267,476
2025	279,500	275,000	267,300		273,933
2030	284,000	279,100	270,900	273,151	276,788
2035		283,100	274,300		278,700

ABAG - Association of Bay Area Governments

CDOF - California Dept. of Finance





UWMP 2010 Population Projection
Figure 3

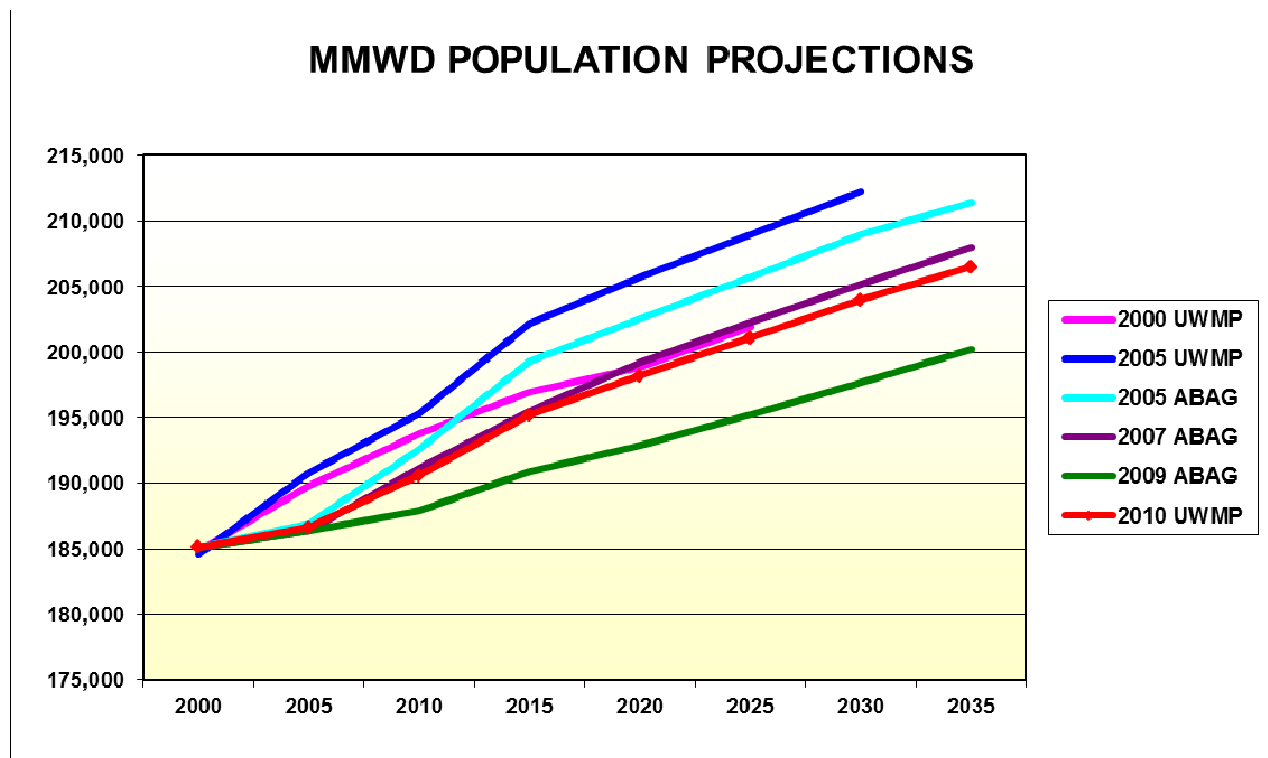
ABAG PROJECTIONS 2009 BY CENSUS TRACT - MARIN COUNTY

CENSUS TRACT	TRACT DESCRIPTION	MMWD	POPULATION							
			2000	2005	2010	2015	2020	2025	2030	2035
106001	Smith Ranch-St Vincents	Yes	3,826	3,857	3,877	3,906	3,930	3,947	3,963	3,980
106002	Santa Venetia	Yes	5,745	5,982	6,056	6,080	6,118	6,137	6,156	6,186
107000	Marinwood-Lucas Valley	Yes	6,400	5,257	5,368	5,385	5,388	5,398	5,410	5,445
108100	Terra Linda	Yes	6,524	6,646	6,732	6,746	6,762	6,775	6,785	6,822
108200	Terra Linda-Los Ranchitos	Yes	6,120	6,503	6,645	6,757	7,292	7,846	8,326	8,770
109000	San Rafael	Yes	7,778	7,842	7,876	8,118	8,293	8,418	8,538	8,668
110100	San Rafael-Dominican	Yes	5,643	5,810	5,876	6,093	6,272	6,397	6,535	6,663
110200	San Rafael-Glenwood-Peacock	Yes	5,432	5,746	5,770	5,796	5,809	5,816	5,824	5,839
111000	San Rafael-Central	Yes	5,528	5,907	6,022	6,032	6,285	6,626	6,921	7,261
112100	San Rafael-Bret Harte	Yes	4,018	4,320	4,366	4,508	4,731	4,869	5,020	5,131
112200	San Rafael-Canal	Yes	11,679	11,716	11,871	12,757	13,004	13,159	13,318	13,501
113000	San Geronimo Valley	Yes	3,797	3,878	3,905	3,917	3,919	3,934	3,936	3,949
114100	Fairfax	Yes	5,142	5,141	5,208	5,275	5,274	5,273	5,275	5,274
114200	Fairfax	Yes	3,092	3,091	3,121	3,139	3,140	3,140	3,139	3,139
115000	Sleepy Hollow	Yes	7,048	7,093	7,103	7,109	7,108	7,108	7,109	7,147
116000	San Anselmo	Yes	3,031	3,046	3,049	3,048	3,047	3,049	3,048	3,058
117000	San Anselmo	Yes	4,655	4,686	4,690	4,689	4,690	4,690	4,689	4,712
118100	Ross	Yes	2,329	2,359	2,360	2,359	2,360	2,360	2,359	2,361
118200	Fairfax-Kentfield-Watershed	Yes	319	326	335	346	345	347	346	347
119100	Kentfield	Yes	4,627	4,631	4,307	4,320	4,328	4,339	4,365	4,382
119200	Greenbrae	Yes	6,538	6,542	6,580	6,646	6,705	6,724	6,777	6,810
120000	Larkspur	Yes	6,040	6,049	6,115	6,130	6,147	6,156	6,169	6,189
121100	Corte Madera	Yes	4,958	5,089	5,092	5,147	5,148	5,168	5,206	5,258
121200	Corte Madera-East	Yes	5,521	5,606	5,715	6,154	6,258	6,406	6,693	7,083
122000	San Quentin Prison	Yes	6,362	6,363	6,381	6,408	6,425	6,434	6,441	6,444
123000	Belvedere	Yes	2,106	2,121	2,123	2,214	2,214	2,214	2,214	2,215
124100	Tiburon-West	Yes	5,377	5,422	5,464	5,484	5,489	5,496	5,504	5,508
124200	Tiburon-East	Yes	5,431	5,532	5,700	5,789	5,884	5,978	6,071	6,166
125000	Strawberry	Yes	3,931	4,007	4,042	4,103	4,130	4,168	4,223	4,247
126100	Mill Valley	Yes	5,527	5,619	5,624	5,632	5,738	5,795	5,900	5,972
126200	Mill Valley	Yes	4,335	4,404	4,409	4,429	4,431	4,432	4,440	4,450
127000	Mill Valley	Yes	4,428	4,488	4,492	4,530	4,596	4,628	4,696	4,808
128100	Tam Valley	Yes	6,188	6,216	6,247	6,268	6,295	6,302	6,317	6,334
128200	Homestead Valley	Yes	4,513	4,578	4,584	4,612	4,626	4,630	4,648	4,651
129000	Marin City	Yes	2,500	2,521	2,538	2,545	2,550	2,559	2,568	2,575
130200	Sausalito	Yes	7,758	7,842	7,946	8,046	8,145	8,244	8,339	8,436
131000	Headlands-Muir Beach	50%	324	327	331	333	333	335	338	341
101100	Novato-Black Point	No	2,539	2,743	2,811	2,875	2,896	2,942	2,971	2,999
101200	Novato	No	2,584	2,753	2,839	2,891	2,925	3,012	3,041	3,074
102100	Novato-San Marin	No	2,347	2,497	2,660	2,711	2,811	2,926	3,013	3,101
102201	Novato	No	9,981	10,411	10,841	11,032	11,295	11,492	11,663	11,873
103100	Novato-West	No	7,682	7,988	8,349	8,355	8,364	8,383	8,391	8,454
103200	Novato	No	6,590	7,010	7,185	7,191	7,270	7,295	7,307	7,339
104101	Novato	No	6,666	7,123	7,480	7,538	7,841	8,098	8,418	8,499
104102	Novato	No	4,959	5,377	5,477	5,499	5,507	5,534	5,541	5,560
104200	Novato-Ignacio	No	5,722	6,087	6,346	6,393	6,465	6,594	6,657	6,741
104300	Novato-Bel Marin Keys	No	1,665	1,833	1,926	2,027	2,134	2,311	2,533	2,590
105000	Novato-Hamilton	No	3,771	4,003	4,412	4,662	4,986	5,023	5,316	5,504
131000	Headlands-Muir Beach	50%	324	327	331	333	333	335	338	341
132100	Stinson Beach-Bolinas	No	2,337	2,336	2,347	2,365	2,373	2,391	2,402	2,406
132200	Inverness-Olema	No	2,332	2,332	2,338	2,339	2,346	2,359	2,370	2,373
133000	Pt Reyes Station-Tomales	No	3,220	3,222	3,233	3,236	3,248	3,305	3,326	3,331
Marin County Population			247,289	252,605	256,495	260,296	264,003	267,297	270,893	274,307
MMWD Service Area Population			184,570	186,563	187,920	190,850	193,209	195,297	197,606	200,122
Non-MMWD Population			62,719	66,042	68,575	69,447	70,794	72,000	73,287	74,185
MMWD Percentage			74.6%	73.9%	73.3%	73.3%	73.2%	73.1%	72.9%	73.0%

UWMP 2010 Population Projection
Figure 4

COMPARISON OF POPULATION PROJECTIONS						
Year	MMWD SERVICE AREA					
	2000 UWMP ¹	2005 UWMP ¹	2005 ABAG ²	2007 ABAG ²	2009 ABAG ²	2010 UWMP ³
2000	184,818	184,570	185,100	185,100	185,100	185,100
2005	189,843	190,800	186,900	186,400	186,400	186,600
2010	193,824	195,362	192,600	191,200	187,900	190,600
2015	196,940	202,155	199,300	195,500	190,900	195,200
2020	198,846	205,763	202,600	199,200	192,900	198,200
2025	201,900	208,971	205,700	202,300	195,200	201,100
2030		212,256	209,000	205,200	197,700	204,000
2035			211,400	208,000	200,200	206,500

Notes: 1) Published MMWD UWMP population values
2) Population projections based on ABAG 2005, 2007 & 2009 SSA data
3) Average of the ABAG based 2005, 2007, 2009 populations projections

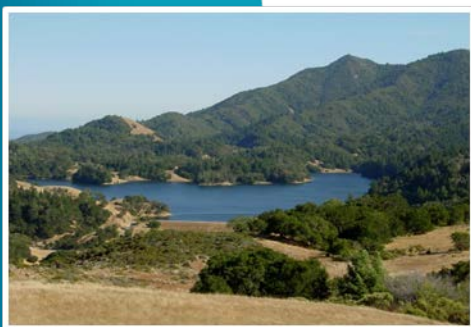


APPENDIX E

Final 2010 Urban Water Management Plan Water Demand Analysis



Marin Municipal Water District



Final 2010 Urban Water Management Plan Water Demand Analysis

February 22, 2011



MADDAUS
WATER
MANAGEMENT

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1. EXECUTIVE SUMMARY

1.1 Introduction

This 2010 Urban Water Management Plan Water Demand Analysis was conducted by Maddaus Water Management (MWM) for Marin Municipal Water District. The purpose of this analysis was to:

1. Calculate a demand forecast for years 2010 to 2035.
2. Evaluate if the current projections with conservation efforts will meet the SBx7-7 per capita water use reduction targets according to Method 3.

1.2 Long-Term Demand and Conservation Program Analysis Results

The first step in the analysis was to review and analyze historical water use production and billing data. The billing data was provided for the years 2000 to 2009. The data was graphically analyzed and discussed with MMWD. The historical water use, along with the selected population projections, were used to create a demand forecast for the years 2010 to 2035.

Once the demands were completed, the 57 conservation measures considered in past studies were re-analyzed. The conservation analysis included all the measures from the 2007 MMWD Water Conservation Master Plan and 2009 Program E analysis conservation studies that MWM completed for MMWD. The following important assumptions about the conservation measures were included in this analysis:

1. Program D in this report is equivalent to the MMWD Conservation Master Plan Program #3.
2. New development ordinances were updated to reflect the new MMWD Board Ordinance 421 (supersedes Ordinance 414 adopted in January 2010), and the Cal Green building code.

Table ES-1 and Figure ES-1 show the projected water demands and conservation savings for Program D for the years 2010 to 2035 without recycled water. The projected demands are higher than the actual production shown for 2005 through 2009 as they are based on a 10 year average from 2000 to 2009. This indicates that the 2005 to 2009 period has been below the historical 10 year average use for MMWD. The Plumbing Code includes the new California State Law requiring High Efficiency Toilets and High Efficiency Urinals by 2014.

The final step in the analysis was to compare the projected 2010 to 2035 demand analysis to the SBx7-7 per capita water use reduction targets for Method 3. According to the preliminary analysis MMWD will meet both the 2015 and 2020 water use targets with the planned MMWD Water Conservation Master Plan Program #3 (Program D) which is the current MMWD Board adopted conservation program. Based on Table 1 and 2 provided in Section 3 of this report, the SBx7-7 year 2020 water use reduction target of 125 gallons per capita per day (gpcd) will be achieved by Program #3 (Program D). The MMWD projected per capita water use in the year 2020 is 125 gpcd.

Figure ES-1: Water Demands with Conservation Savings

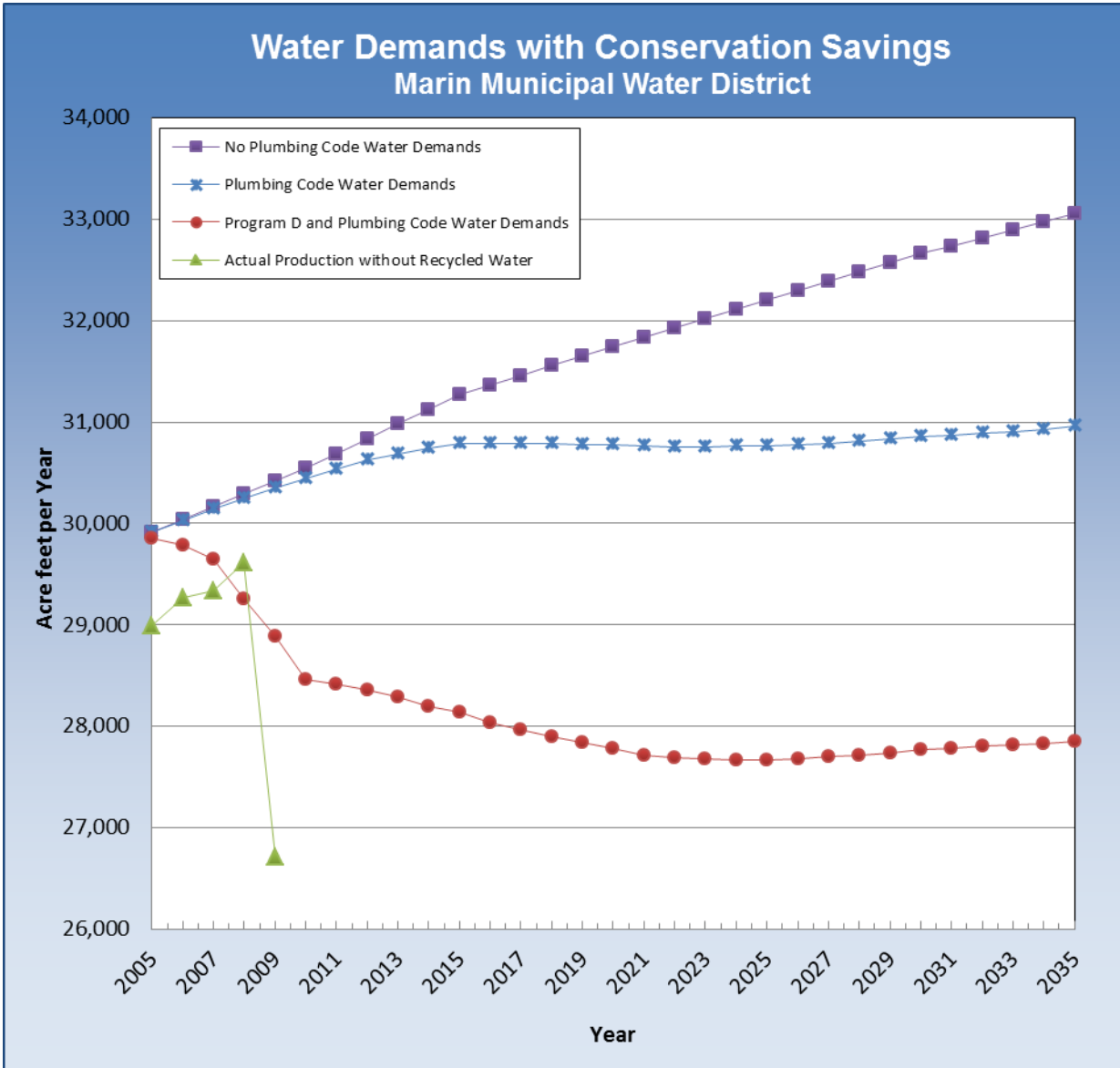


Table ES-1: Potable and Untreated Water Demand Projections

Water Demand Projections (AF/Yr) Marin Municipal Water District							
Conservation Program	2005	2010	2015	2020	2025	2030	2035
No Plumbing Code Water Demands	29,912	30,544	31,270	31,744	32,202	32,661	33,056
Plumbing Code Water Demands	29,912	30,439	30,791	30,772	30,766	30,855	30,955
Program D and Plumbing Code Water Demands	29,856	28,462	28,134	27,778	27,667	27,766	27,847
Actual Production without Recycled Water	28,990						

2. INTRODUCTION AND PURPOSE

The purpose of this report is to present an overview of the demand and conservation evaluation process which has been completed for the Marin Municipal Water District. The goal was to develop forecasts of demand and conservation savings for the 2010 Urban Water Management Plan.

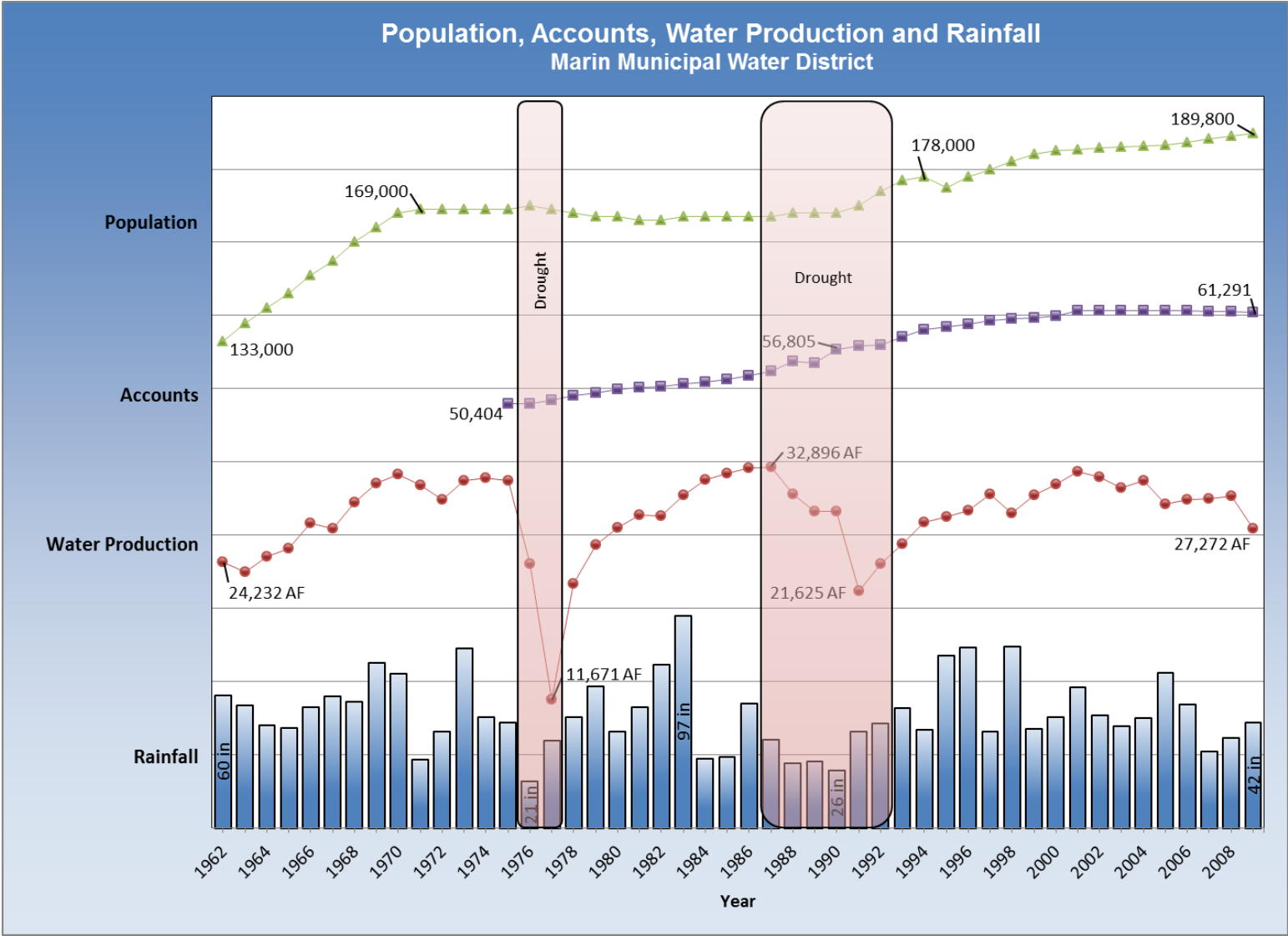
Historical water production (including recycled water) and population and rainfall are shown in Figure 1 for the years 1962 to 2009. It is clear that demand has been impacted by repeating droughts and economic conditions since 1962. In the past decade demand growth has slowed with the slowing of the growth of new water accounts.

The conservation measures and programs were analyzed using the Least Cost Planning Water Demand Management Decision Support System (DSS Model). In this report the terms demand management and water conservation are used interchangeably. The evaluation included measures directed at existing accounts as well as new development measures to make new residential and business customers more water efficient. This report focuses on the District's adopted Water Conservation Master Plan – Program 3 (Program D). An update to our prior work is provided with the results for each of the fifty seven individual measures and five programs in Appendix B to F.

This report provides a general overview for the methodology, assumptions, and results for the demand forecast and conservation analysis. The following information is included in this report and is discussed in individual sections below:

- Per capita water use reduction targets
- Baseline water demands with and without the plumbing code
- Comparison of individual conservation measures
- Results of the conservation analysis
- Conclusions
- Appendix A: Water Production and Billing Data Graphs for all Customer Categories
- Appendix B: Conservation Measure Descriptions
- Appendix C: Conservation Measures in Program A, B, C, D and E
- Appendix D: Assumptions for the Conservation Measures Evaluated
- Appendix E: Comparison of Individual Conservation Measures
- Appendix F: Detailed Results of Conservation Program Analysis

Figure 1: Historical Population, Accounts, Water Production and Rainfall (1962-2009)



3. PER CAPITA WATER USE REDUCTION TARGETS

In 2009 the California state legislature passed Senate Bill x7-7 as part of the Delta Water Package. Pursuant to SBx7-7, the state established a goal to reduce urban per capita water use by 20 percent no later than December 31, 2020, and by at least 10 percent no later than December 31, 2015.

SBx7-7 requires that urban retail water suppliers (URWS) which deliver more than 3,000 acre-feet of water or that serve more than 3,000 connections meet specified 2015 and 2020 water use targets (Targets) using one of four methods: (1) Method 1: a 20 percent reduction in baseline per capita water use, (2) Method 2: compliance with established performance standards, (3) Method 3: a 5 percent reduction from the applicable state hydrologic region target set in the California Department of Water Resources (DWR) April 2009 Draft 20x2020 Water Conservation Plan, or (4) Method 4: a method that will be released by DWR in late February 2011. At a minimum, an URWS must reduce its per capita daily water use by at least 5 percent, unless that URWS has a baseline water use of less than 100 gallons per capita per day (gpcd).

MMWD is pursuing development of a preliminary assessment of individual targets and estimated water savings requirements. The preliminary SBx7-7 analysis relies on currently available data provided by MMWD and water use projections from this report (i.e., population, historical and future water use information). The preliminary SBx7-7 analysis focuses on Method 3. Methods 1, 2 and 4 are not being pursued as part of the preliminary SBx7-7 analysis because they are more complex, require data that is not readily available, or will not be authoritatively finalized until late February 2011 (Method 4). Method 1 was previously calculated by MMWD staff and would require a higher reduction in per capita water use than Method 3. Therefore, the analysis in this report reviews the results compared to the SBx7-7 Per Capita Water Use Reduction Targets as outlined in Method 3. In addition to meeting the targets individually, MMWD is also evaluating a regional approach to meeting SBx7-7 with other water contractors in Marin and Sonoma counties. This evaluation is being conducted outside the scope of this report.

Base Daily Per Capita Water Use is defined as average gross water use, expressed in gallons per capita per day, for a continuous, multiyear base period. The Water Code specifies two different base periods for calculating Daily Per Capita Water Use under Water Code Sections 10608.20 and 10608.22:

- The first base period is a 10 to 15-year continuous period (ending no earlier than December 31, 2004 and no later than December 31, 2010) that is used to calculate baseline per capita water use per Water Code Section 10608.20 ("Baseline Water Use").¹ The District's baseline per capita water use for the 10 year period of 1995 through 2004 is 146 gpcd.
- The second base period is a continuous 5-year period (ending no earlier than December 31,

¹DWR Draft Urban Water Use Target Technical Methodologies, July 12, 2010: If recycled water comprises less than 10 percent of 2008 retail water delivery, the baseline values must be calculated over a continuous 10-year period ending no earlier than December 31, 2004 and no later than December 31, 2010. If recycled water comprises more than 10 percent of 2008 retail water delivery, the baseline values must be calculated over a continuous 10 to 15-year period ending no earlier than December 31, 2004 and no later than December 31, 2010.

2007, and no later than December 31, 2010) that is used to determine if the 2020 per capita water use Target meets the legislation's minimum water use reduction requirement per Water Code Section 10608.22 ("Current Water Use"). The District's current per capita water use for the 5 year period 2003 through 2007 is 143 gpcd.

MWM developed two tables (below) that provide a straightforward calculation of a preliminary estimate of the Method 3 Target, compared to the projected per capita demands with Program D for MMWD. The preliminary tables conform to the methodology approved by DWR and the SBx7-7 legislation. Based on 2009 historical water production of 26,716 AF/Yr (the value of 26,717 AF/Yr calculated from the 2009 total MMD production value is 27,272 AF/Yr shown on Figure 1 minus the recycled water production from 2009 of 556 AF/Yr) and population projection of 189,800, the 2009 per capita water use is 126 gpcd. Due to the weather patterns, economic conditions and statewide drought in recent years, this gpcd is the lowest since the prolonged drought of the late 1980's through early 1990's and not representative of normal conditions for the service area. The projections included in this report and shown in Table 2 utilize an average period of water use from 2000 to 2009. Table 2 shows that Program D will meet the 2020 SBx7-7 per capita targets.

Table 1: SBx7-7 Targets, gallons per person per day (gpcd)

SB7x-7 Targets, gallons per person per day (gpcd) Marin Municipal Water District		
Description	2015	2020
Method 3 Per Capita Target for MMWD*	137	125

*Assumes Hydrologic Region 2 – San Francisco Bay Area

Table 2: Projected Per Capita Water Use, gpcd

Projected Per Capita Water Use, gpcd Marin Municipal Water District		
Description	2015	2020
Per Capita Demand with Program D	129	125

4. WATER DEMANDS WITH AND WITHOUT PLUMBING CODE

4.1 Future Population and Employment Projections

Description of Population and Employment Forecasts

There are generally two main sources of population and employment projections used for the 2010 Urban Water Management Plan.

Available Demographic Projections

- Local General Plan (population and employment) – Typically these plans, depending upon when they were published, have a population and jobs forecast for 2030 and build out.
- Association of Bay Area Governments (ABAG) (population and employment) - ABAG recently published a new projections report in 2009 that includes population and employment estimates for each city in the Bay Area. This report provides estimates for 2000, 2005, 2010, 2015, 2020, 2025, 2030 and 2035. ABAG publishes demand projections every two years. The previous DSS Model projections and the ABAG Projections for 2005, 2007, and 2009 were reviewed to determine the most appropriate data set to use in this DSS Model update.

As shown in Appendix G MMWD developed the population projections for this report. The population and employment projections were based on the average of the values from ABAG 2005, 2007 and 2009 data as shown in Figures 4 and 5 and Tables 3 and 4, to be consistent with the District's planning projections. The values shown in the "Average" column were used to create the water demand projections.

Figure 4: Comparison of Population Projections

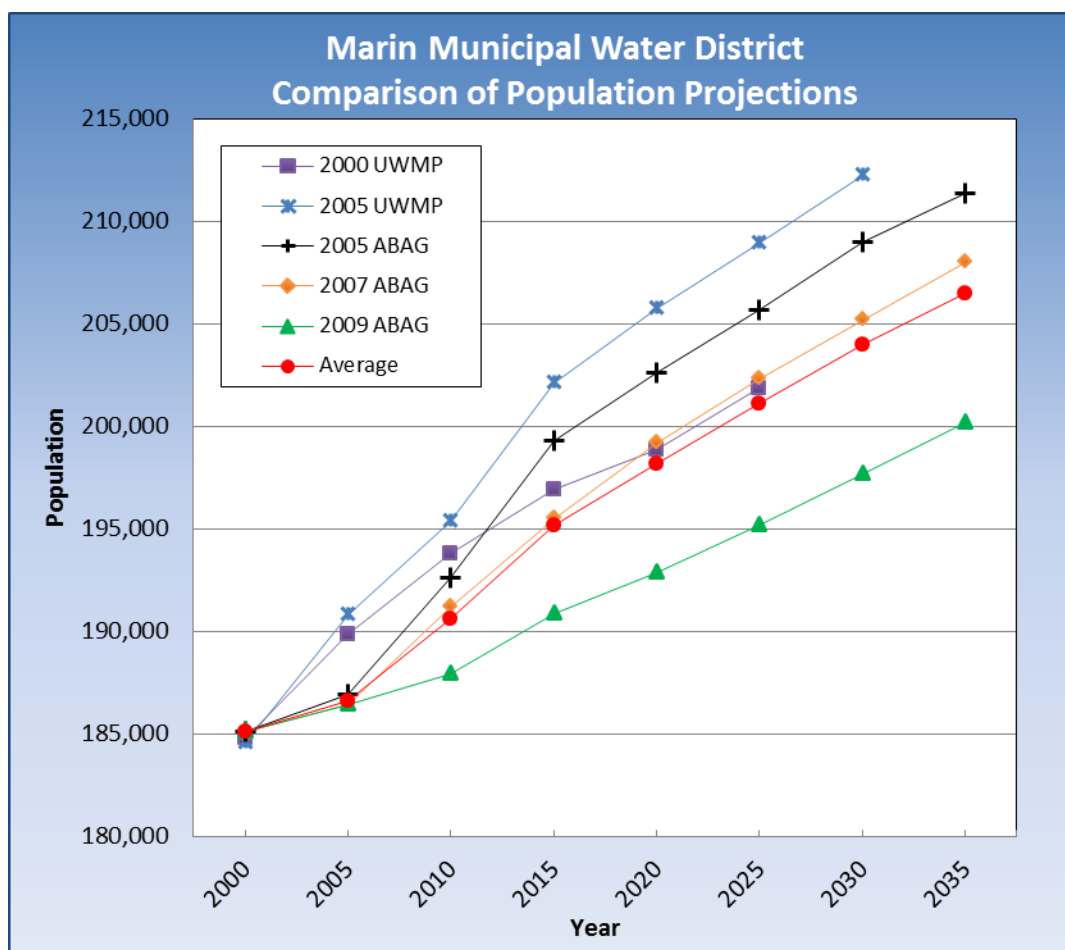


Table 3: Comparison of Population Projections

Comparison of Population Projections						
MMWD Service Area						
Year	2000 UWMP ¹	2005 UWMP ¹	2005 ABAG ²	2007 ABAG ²	2009 ABAG ²	Average ³
2000	184,818	184,570	185,100	185,100	185,100	185,100
2005	189,843	190,800	186,900	186,400	186,400	186,600
2010	193,824	195,362	192,600	191,200	187,900	190,600
2015	196,940	202,155	199,300	195,500	190,900	195,200
2020	198,846	205,763	202,600	199,200	192,900	198,200
2025	201,900	208,971	205,700	202,300	195,200	201,100
2030		212,256	209,000	205,200	197,700	204,000
2035			211,400	208,000	200,200	206,500

1) Published MMWD UWMP population values

2) Population projections based on ABAG 2005, 2007 & 2009 data

3) Average of the ABAG based 2005, 2007, 2009 populations projections

Figure 5: Comparison of Employment Projections

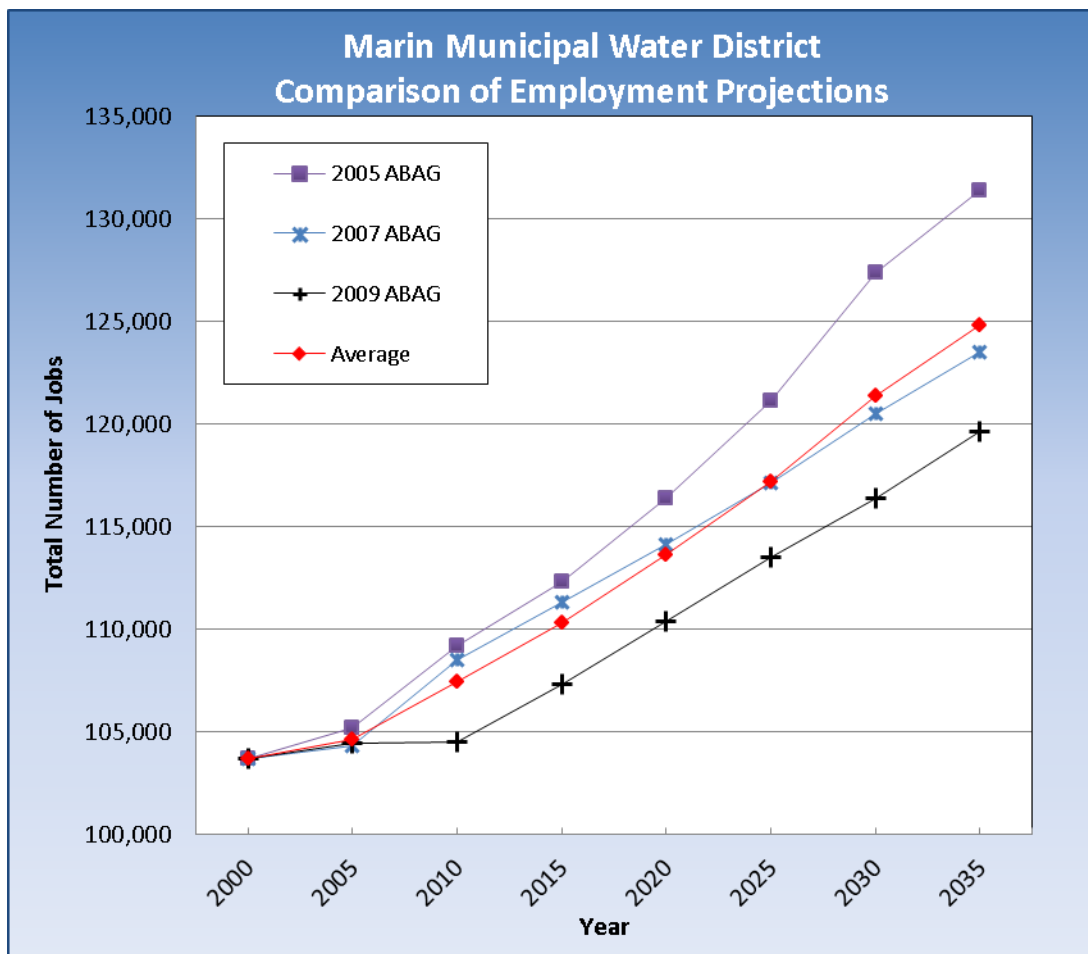


Table 4: Comparison of Employment Projections

Comparison of Employment Projections				
MMWD Service Area				
Year	2005 ABAG ¹	2007 ABAG ¹	2009 ABAG ¹	Average ²
2000	103,700	103,700	103,700	103,700
2005	105,200	104,300	104,400	104,600
2010	109,200	108,500	104,500	107,400
2015	112,300	111,300	107,300	110,300
2020	116,400	114,100	110,400	113,600
2025	121,100	117,100	113,500	117,200
2030	127,400	120,500	116,400	121,400
2035	131,400	123,500	119,600	124,800

1) Employment projections based on ABAG 2005, 2007 & 2009 data

2) Average of the ABAG based 2005, 2007, 2009 employment projections.

4.2 Water Use and Demographic Data Inputs to the Model

Description of “Water Use Data Input Sheet”

Figure 6 is a two-page print out of an Excel spreadsheet. The purpose of this “Water Use Data Input Sheet” is to gather and document basic information about the service area. The data shown on the “Water Use Data Input Sheet” can be broken into two main categories: (a) current water use data and (b) demographic data. Each area is broken out below and helps to provide some basic definitions and assumptions.

(a) Water Use Data

- *Model Start Year* – This is the starting year for the analysis. For this project, the start year for the model is 2005. The selection of 2005 as a model start year allowed the historical conservation efforts to be included for the past 5 years (2005 to 2009). The DSS Model includes 30 years of data projecting information until the year 2035.
- *10-Year Average for Future Water Factors* – Based on an analysis of historical water billing data, MMWD selected an average of 2000 to 2009 that is representative of current water use and used as a base year demand factor for developing future water use projections. The average of 10 years of data minimizes the impacts of any single year conditions such as recession impacts, droughts, excessively wet years, so no significant weather adjustments were necessary. The water billing or production data was not weather normalized for this analysis.
- *Average gal/day/acct* – This is the amount of water in gallons that is used per day, per account.
- *Indoor/outdoor water use* – This is the amount of water per account split into the percent that is used indoors and outdoors.
- *Consumption by customer class* – This shows the annual amount of water used for an entire calendar year, broken down by customer class (Single Family, Apartments, Commercial, Irrigation).
- *Provision for New Single Family Account Use* – A new category was created to model water use of new single family homes. This value is held constant in the baseline projection and not subject to plumbing codes. All new homes include the plumbing code change in the State of California that requires HETs in 2014. The new homes will also be affected by Cal Green building code after July 1, 2011 and required to install efficient fixtures for the toilets, low flow shower heads and faucets.
- *Unbilled or unmetered water also known as Unaccounted for Water or Non-Revenue Water* – This is the sum of all water input to the system that is not billed (metered and unmetered) water consumption, including apparent (metering accuracy) and real losses. The values were calculated by taking the difference between the amount of water produced and the amount of water that was sold. Data provided by the District was used to calculate the unbilled or unmetered water percentage.
- *Water Produced* – This is the total amount of potable and untreated water produced. The water can come from multiple sources including water purchased from other agencies, local surface water, or obtained from groundwater. This does not include recycled water.
- *Peak day factor* – The ratio of water produced on the maximum day of the year to that produced on the average day.

(b) Demographic Data

- *Census 2000* – The 2000 Census data was used as a general reference when determining population and household sizes for each individual city (and/or unincorporated area) serviced by the water agencies.
- *2005 MMWD Service Area Population* – The 2005 total population was taken directly from the selected population projection source as discussed and shown in Table 3.
- *Single family and multifamily dwelling units* – The 2005 single family dwelling units is equal to the number of single family accounts for 2005. The 2005 multifamily dwelling unit estimate was calculated by applying a growth factor to the 2000 data as noted on the water use data sheet in Figure 6.
- *Employment data* – The employment figures were obtained from the selected source as discussed earlier in this report.

In summary, the key features of this sheet include the existing 2005 level of water use, 2005 baseline accounts in each customer category, and 2005 baseline forecasts for population and employment.

Effects of Household Size Changes and Housing Vacancy Rates

- The effects of household size changes on future water demand can either increase or decrease future water demands. If household size decreases it takes more housing units to accommodate the existing population. According to the U.S. Census for Marin County from 2000 to the average of years 2005-2009, household size increased slightly from 2.34 to 2.35. (Note these values are provided for reference purposes for the entire county from the US Census and are not specific to the MMWD service area). This could be because during the housing boom that occurred in this period not all new housing units were occupied. Nevertheless the rate of change is very small and will have a negligible effect on future water demand if the trends continue at the current rate.
- According to the U.S. Census the Marin County homeowner vacancy has increased from 0.7 percent in 2000 to 0.9 percent during the average of years 2005-2009. (Note these values are provided for reference purposes for the entire county from the US Census and are not specific to the MMWD service area). This could be because during the housing boom that occurred in this period not all new housing units were occupied. Some vacancy is normal and it is not clear what is normal vacancy. As the base water use for MMWD was a ten year average (2000 to 2009) the impact is reflected in the base water use used for starting the water demand projection.

Figure 6: Water Use Data Input Sheet

Marin Municipal WD Water Service Area ¹								
DSS Input Sheet								
October 18, 2010								
Base Year Average Use and Indoor Percentages by Billing Category for DSS Model²								
	Single family		Apartments		Duplex + 3 or 4 Units		Institutional	
Year	Average, gpd/a	Indoor	Average, gpd/a	Indoor	Average, gpd/a	Indoor	Average, gpd/a	Indoor
2000-2009	277	57%	1642	88%	320	73%	6729	85%
	Bimonthly billing		Apartments are 5 or more units		Includes 1, 2, 3 and 4 units		Bimonthly billing	
			Bimonthly billing		Bimonthly billing			
	Business		Irrigation		SF Irrigation		Untreated Water	
	Average, gpd/a	Indoor	Average, gpd/a	Indoor	Average, gpd/a	Indoor	Average, gpd/a	Indoor
	830	73%	1334	0%	590	0%	156407	0%
	Bimonthly billing		Bimonthly billing		Bimonthly billing		Bimonthly billing	
	New Single Family							
	Average, gpd/a	Indoor						
	277	57%						
	Bimonthly billing							
Data for DSS Model								
Category	Average Number of Accounts in Base Year(s) ³	Average Water Use in Base Year(s) ² (gpd/a)	Average Water Use in Base Year(s) ² (mgd)	Percent of Total Water Use	Total Water Use (gcd)	Indoor Water Use (gcd)		
Single family	50,790	277	14.088	59.91%	111	63		
Apartments	1,443	1,642	2.369	10.07%	70	62		
Duplex + 3 or 4 Units	3,079	320	0.986	4.19%	80	59		
Business	3,376	830	2.801	11.91%				
Irrigation	983	1,334	1.312	5.58%				
Institutional	241	6,729	1.622	6.90%				
Untreated Water	2	156,407	0.313	1.33%				
SF Irrigation	41	590	0.024	0.10%				
New Single Family	1	277	0.000	0.0012%				
Total	59,956	168,406	23.515	100.00%				
Estimated UFW for DSS Model⁵			11.9%	Percent	7% if actual is < 7%, otherwise = agreed upon by agency for 30 year forecast			
Water Produced for use in DSS Model⁴			26.704	MGD	Add UFW % to Total Billed Water Use			
Peaking Factor			1.45	Provided by Agency or Water Master Plan (or NA)				
Peaking Factor for DSS Model			1.45	If NA use default value of 1.6.				
	- Blue cells are entered by modeler							
	- Yellow cells are input to DSS Model							
NOTES								
1. - Communities served includes portions of Novato and surrounding rural areas								
2 - Average gpd/a is based on an average of all months in selected base year(s). Indoor use is based on average of 2 lowest consecutive months in the winter if meters read bimonthly, or single lowest month if meters read monthly.								
3 - Number of accounts is the average number of billed accounts for the base year(s) selected (see worksheet with account data in this file)								
4 - Total water Purchased (produced) provided by Marin Municipal Water District.								
5 - Unaccounted for Water (UFW) is the percent difference between the total water purchased and the total water use.								
6 - For reference see additional population estimates provided in population and employment estimates corresponding to service area table.								
7 - Initial estimate based on census data for renter occupied units. For reference see table below that has 2000 census data for corresponding water service area city or cities.								
8 - Group Quarters Population includes Institutionalized and non-Institutionalized and assumes their water use is in the Commercial sector								
Definitions / Abbreviations								
ABAG	Association of Bay Area Governments		HHS	household size				
DOF	Department of Finance		NA	not available				
DSS	Decision Support System Model		MF	multi family				
du	dwelling unit		MGD	million gallons per day				
FY	Fiscal Year		No.	number				
gcd	gallons per capita / per day		Pop	population				
gpd/a	gallons per day / per account		Res	residential				
gpd	gallons per day		SF	single family				
			UFW	unaccounted for water				
Data Prepared :	December 1, 2005	By: M. Maddaus						
Revised:	December 15, 2006	By: W. Maddaus						
Revised:	October 18, 2010	By: C. Matyas						
Revised:	February 17, 2011	By: C. Matyas						

Note: 26.704 MGD times 1120.14 conversion factor equals 29,912 AF/Yr (rounded) production for the year 2005



**Figure 6:
(Continued)**

[illegible]

4.3 Key Assumptions for the DSS Model

Table 5 shows the key assumptions used in the model. The assumptions having the most dramatic effect on future demands are the natural replacement rate of fixtures, how residential or commercial future use is projected, and finally the percent of estimated water losses including unmetered and unbilled use.

Table 5: List of Baseline Demand Projection Assumptions for DSS Model

List of Baseline Demand Projection Assumptions for DSS Model Marin Municipal Water District	
Parameter	Model Input Value, Assumptions, and Key References
Model Start Year	2005
Water Demand Factor Year(s)	Average of Years: 2000-2009
Peak Day Factor	1.45
Unbilled or Unmetered Water in the Start Year	11.9%
Population Projection Source	Average of ABAG years 2005, 2007, 2009
Employment Projection Source	Average of ABAG years 2005, 2007, 2009
Number of Water Accounts for Start Year	59,956
Distribution of Water Use Among Categories	Single Family: 59.9% Apartments: 10.1% Duplex: 4.2% Business: 11.9% Irrigation: 5.6% Institutional: 6.9% Raw Water: 1.3% Single Family Irrigation: 0.1% New Single Family: 0%
Indoor Water Use by Category	Single Family: 56.8% Apartments: 88.2% Duplex: 73.5% Business: 72.7% Irrigation: 0% Institutional: 85.5% Raw Water: 0% Single Family Irrigation: 0% New Single Family: 56.8%
Residential End Uses	AWWARF Report "Residential End Uses of Water" 1999
Non-Residential End Uses, %	AWWARF Report Commercial End Uses of Water" 1999
Efficient Residential Fixture Current Installation Rates	U.S. Census, Housing age by type of dwelling plus natural replacement plus rebate program (if any). Reference "High Efficiency Plumbing Fixtures - Toilets and Urinals" Koeller & Company July 23, 2005. Reference Consortium for Efficient Energy (www.cee1.org)
Water Savings for Fixtures, gal/capita/day	AWWARF Report "Residential End Uses of Water" 1999, , CUWCC Cost and Savings Study April 28, 2005, Agency supplied data on costs and savings, professional judgement where no published data available
Non-Residential Fixture Efficiency Current Installation Rates	U.S. Census, assume commercial establishments built at same rate as housing, plus natural replacement
Residential Frequency of Use Data, Toilets, Showers, Washers, Uses/user/day	Falls within ranges in AWWARF Report "Residential End Uses of Water" 1999
Non-Residential Frequency of Use Data, Toilets and Urinals, Uses/user/day	Estimated based using AWWARF Report "Commercial and Institutional End Uses of Water" 1999
Natural Replacement Rate of Fixtures	Residential Toilets 3% (1.28 gpf toilets), 3% (1.6 gpf and higher toilets) Commercial Toilets 3% (1.28 gpf toilets), 3% (1.6 gpf and higher toilets) Residential Showers 4% Residential Clothes washers 6.7% A 3% replacement rate corresponds to 33 year life of a new fixture. A 6.67% replacement rate corresponds to 15 year washer life based on "Bern Clothes Washer Study, Final Report, Energy Division, Oak Ridge National Laboratory, for U.S. Department of Energy, March 1998, Internet address: www.energystar.gov
Future Residential Water Use	Increases Based on Population Growth
Future Non-Residential Water Use	Increases Based on Population Growth

4.4 Water Demand Projections With and Without the Plumbing Code

Development of the Water Demand Projections Tables and Graphs

Water demand projections were developed to the year 2035 using the Demand Side Management Least Cost Planning Decision Support System (DSS) model. This model incorporates information from the:

- “Water Use Data Sheet” and the “Key Assumptions”
- Association of Bay Area Governments Projections
- Data provided by MMWD staff including estimates for value of water saved, historical water use, past conservation efforts, and water system facilities.

Table 6 shows the projected demands with and without plumbing codes and appliance standards. This page includes both a table and a graph. Each will be described below.

National Plumbing Code

The Federal Energy Policy Act of 1992, as amended in 2005, requires only fixtures meeting the following standards can be installed in new buildings:

- Toilet – 1.6 gal/flush maximum
- Urinals – 1.0 gal/flush maximum
- Showerhead - 2.5 gal/min at 80 psi
- Residential Faucets – 2.2 gal/min at 60 psi
- Public Restroom Faucets - 0.5 gal/min at 60 psi
- Dishwashing pre-rinse spray valves – 1.6 gal/min at 60 psi

Replacement of fixtures in existing buildings is also governed by the Federal Energy Policy Act that requires only devices with the specified level of efficiency (shown above) can be sold today (2010). The net result of the plumbing code is that new buildings will have more efficient fixtures and old inefficient fixtures will slowly be replaced with new more efficient models. The national plumbing code is an important piece of legislation and must be carefully taken into consideration when analyzing the overall water efficiency of a service area.

In addition to the plumbing code, the US Department of Energy regulates appliances such as residential clothes washers. Regulations to make these appliances more energy efficient has driven manufacturers to dramatically reduce the amount of water these efficient machines use. Generally horizontal axis washing machines use 30 to 50 percent less water than conventional models (which are still available). In the analysis for MMWD, the DSS Model forecasts a gradual transition to high efficiency clothes washers (using 19 gallons or less) so that by the year 2020 this will be the only type of machines purchased. In addition to the industry becoming more efficient, rebate programs for washers have been successful in encouraging customers to buy more water efficient models. Given that machines last about 15 years eventually all machines in the MMWD area will be of this type.

State Plumbing Code

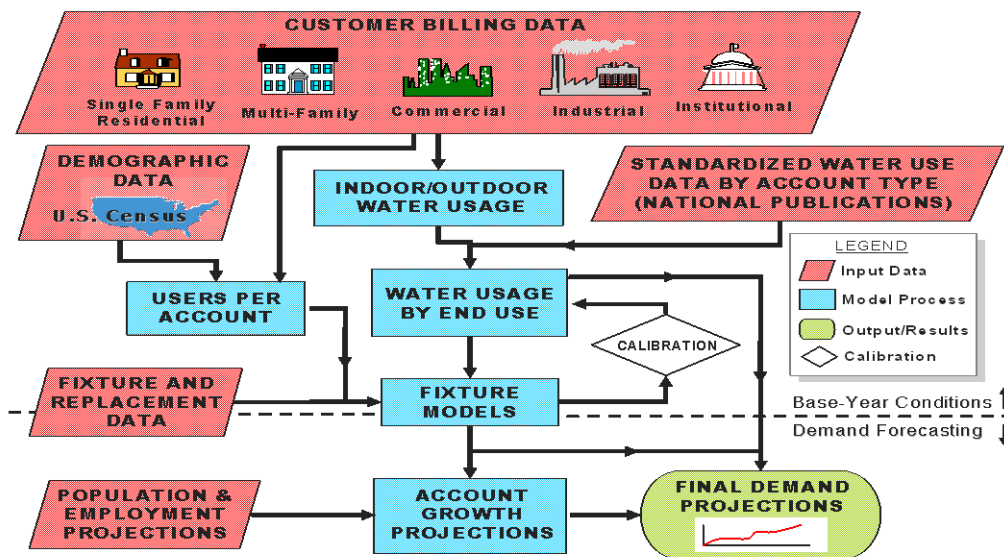
The Plumbing Code includes the new California State Law requiring High Efficiency Toilets (HETs) and High Efficiency Urinals be exclusively sold in the state by 2014.

Cal Green (New Development Building Code): MWM added the Cal Green requirements that effect all new development in the State of California after January 1, 2011. MWM modeled water savings from the

Cal Green building code by updating the new development schedules for all customer categories as appropriate to the following areas: urinals, HETs, high efficiency faucets and showerheads. As this is a new development law it was assumed actual water savings seen by the District would begin to occur in the year 2012.

Figure 7 below describes conceptually how the above listed items are incorporated into the flow of information in the DSS Model.

Figure 7: DSS Model Overview Used to Make Potable and Untreated Water Demand Projection “With the Plumbing Code”



Graph of projected demands (Figure 8)

Figure 8 shows the potable and untreated water demand projection. The graph shows projections for demand with and without the plumbing code through 2035. The projected demands are higher than the actual production shown for 2005 through 2009 as they are based on a 10 year average from 2000 to 2009. This indicates that the 2005 to 2009 period has been below the historical 10 year average use for MMWD.

Table of water demand projections (Table 6)

The table of water demands projections includes:

1. The water demand projections shown in Table 6 are based on the future population projections provided in Table 3 and Table 4.
2. Projections were made *with and without* the plumbing codes.
3. Projections are for potable and untreated water only. It does not include recycled water use. Recycled water use and projections are included in a separate section of the UWMP.

Dry Year Demands

The demand projections reflect average weather conditions and do not reflect drier and hotter drought conditions. Climate change (which might alter weather patterns), either increased or decreased rainfall, and possibly increased irrigation demand in the spring and fall due to a warmer climate have also not been addressed in this analysis.

Figure 8: Potable and Untreated Water Use Projections

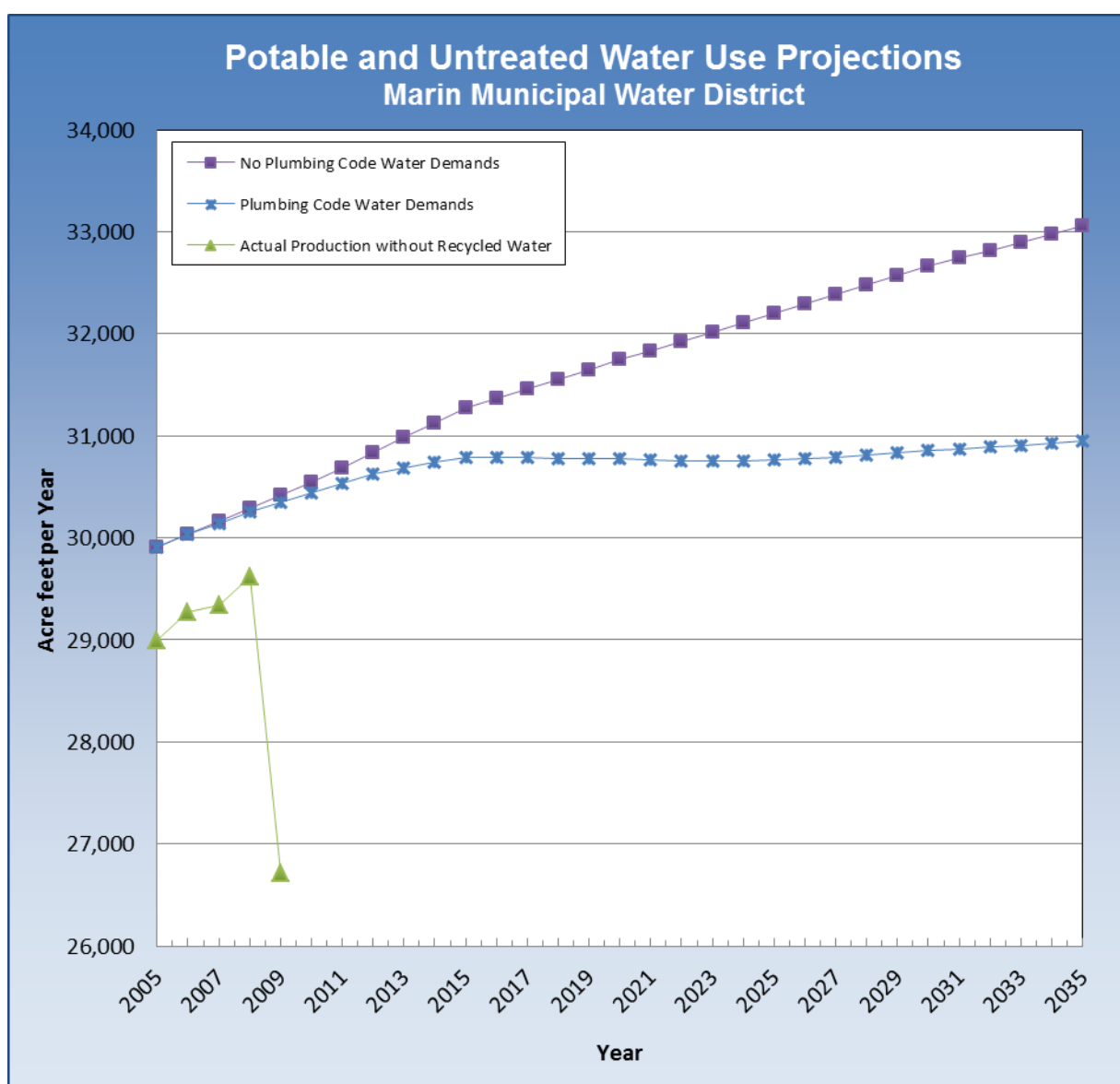


Table 6: Potable and Untreated Water Use Projections

Potable and Untreated Water Use Projections (AF/Yr) Marin Municipal Water District							
Conservation Program	2005	2010	2015	2020	2025	2030	2035
No Plumbing Code Water Demands	29,912	30,544	31,270	31,744	32,202	32,661	33,056
Plumbing Code Water Demands	29,912	30,439	30,791	30,772	30,766	30,855	30,955
Actual Production without Recycled Water	28,990						

*Data is not weather normalized. Total Water use is potable and untreated only. Does not include recycled water use. Recycled water use and projection are in a separate section in the UWMP.

4.5 Water Demand Projections – 2005 Urban Water Management Plan (UWMP) Format

The 2010 Urban Water Management Plan Final Guidance Document from the California Department of Water Resources is not planned to be released until late February 2011. Without the guidance document, the exact formatting of the tables for the 2010 UWMP are not known. Therefore, it was elected to place the demand data into the 2010 Draft Guidebook UWMP format.

Conversion of the Water Demand Projections Table and Graph to 2010 UWMP Format

The Draft 2010 Urban Water Management Plan Guidance Document from the California Department of Water Resources (CA DWR) requests that future demand information be in a specific format. Provided below are the five tables relating to future average day demands they requested. The demand projection shown is the “with Plumbing Code” demands and is otherwise the same as Table 6 and Figure 8. The demand projections in the Urban Water Management Plan appear in the required DWR tables 2, 3, 4, 5, 6, 7, 9, 10 and 11 (2010 Draft UWMP Guidebook table numbers).

Urban Water Management Plan Tables for of 2010 UWMP

Table 7 below provides historical and future population estimates for the MMWD service area.

Table 7: (DWR Table 2) Population – Historical and Projected

Population Estimates Marin Municipal Water District	
Year	Population
2005	186,600
2010	190,600
2015	195,200
2020	198,200
2025	201,100
2030	204,000
2035	206,500

Historical and Future Water Use by Customer Type

The historical and projected number of connections and deliveries to MMWD’s water distribution system, by sector, are identified below on Table 8 (does not include unmetered or unbilled water).

Table 8: (DWR Table 3, 4, 5, 6 and 7) Historical and Projected Water Deliveries

Water Deliveries Marin Municipal Water District										
Year			Water Use Sectors							
			Single Family	Apartments	Duplex	Business	Irrigation	Institutional	Single Family Irrigation	Total
2005	metered	# of accounts	50,796	1,443	3,078	3,376	986	241	41	59,961
		Deliveries AF/Yr	15,026	2,570	1,060	3,061	1,293	1,726	27	24,762
2010	metered	# of accounts	50,790	1,474	3,145	3,448	1,004	246	41	61,237
		Deliveries AF/Yr	15,771	2,688	1,126	3,143	1,501	1,855	27	26,449
2015	metered	# of accounts	50,790	1,510	3,221	3,532	1,029	252	41	62,714
		Deliveries AF/Yr	15,591	2,687	1,132	3,150	1,537	1,900	27	26,752
2020	metered	# of accounts	50,790	1,533	3,270	3,586	1,044	256	41	63,677
		Deliveries AF/Yr	15,334	2,647	1,122	3,134	1,561	1,929	27	26,735
2025	metered	# of accounts	50,790	1,555	3,318	3,638	1,060	260	41	64,608
		Deliveries AF/Yr	15,090	2,612	1,112	3,124	1,583	1,958	27	26,733
2030	metered	# of accounts	50,790	1,578	3,366	3,691	1,075	263	41	65,539
		Deliveries AF/Yr	14,901	2,592	1,108	3,121	1,606	1,986	27	26,813
2035	metered	# of accounts	50,790	1,597	3,407	3,736	1,088	267	41	66,342
		Deliveries AF/Yr	14,753	2,579	1,106	3,119	1,626	2,010	27	26,903

Sales to Other Water Agencies

MMWD does not currently sell water to any other agency. According to MMWD, all “outside sales” are local businesses and residents, and not to another agency.

Table 9: (DWR Table 9) Sales to Other Agencies

Sales to Other Agencies Marin Municipal Water District							
	2005	2010	2015	2020	2025	2030	2035
Water Distributed	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Total	N/A	N/A	N/A	N/A	N/A	N/A	N/A

Additional Water Uses and Losses

For this project unbilled or unmetered water is defined to be the difference between water produced and water sold to customers. Unbilled or unmetered water use normally includes unmetered water use such as for fire protection and training, system and street flushing, sewer cleaning, construction, system leaks, and unauthorized connections. Unbilled or unmetered water can also result from meter inaccuracies. The unbilled or unmetered water uses and real losses are listed in Table 10 below in the “system losses” row.

Table 10: (DWR Table 10) Additional Water Uses and Losses, AF/Yr

Additional Water Uses and Losses, AF/Yr Marin Municipal Water District							
Water Use	2005	2010	2015	2020	2025	2030	2035
Saline Barriers	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Groundwater Recharge	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Conjunctive Use	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Raw Water	291	350	350	350	350	350	350
Recycled Water	N/A	N/A	N/A	N/A	N/A	N/A	N/A
System Losses	3,936	3,639	3,688	3,686	3,683	3,692	3,702
Other	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Total	4,227	3,989	4,038	4,036	4,034	4,042	4,052

Total Water Use

The total historical and future water use for the system is shown in the table below.

Table 11: (DWR Table 11) Total Water Use, AF/Yr*

Total Water Use, AF/Yr Marin Municipal Water District							
Water Use	2005	2010	2015	2020	2025	2030	2035
Total Water Use, AF/Yr	28,990	30,439	30,791	30,772	30,766	30,855	30,955

*Total Water use is potable and untreated only. Does not include recycled water use. Recycled water use and projection are in another section of the UWMP.

Total Water Use with Conservation Program D

The District adopted its 2007 Water Conservation Master Plan in June 2007. The plan includes various conservation measures. The most aggressive conservation plan is called Program 3 (Maddaus Program D). Although Program D is not currently funded in 2010 by MMWD due to revenue constraints, the table below shows the projected reduction of demands if Program D were to be implemented. Program D savings can also be seen in Table 13.

Table 12: Total Water Use with Program D, AF/Yr*

Total Water Use with Program D, AF/Yr Marin Municipal Water District							
Water Use	2005	2010	2015	2020	2025	2030	2035
Total Water Use, AF/Yr	28,990	30,439	30,791	30,772	30,766	30,855	30,955
Program D Savings, AF/yr		1,977	2,656	2,994	3,099	3,089	3,108
Total Water Use with Program D, Af/yr		28,462	28,134	27,778	27,667	27,766	27,847

*Total Water use is potable and untreated only. Does not include recycled water use. Recycled water use and projection are in another section of the UWMP.

5. RESULTS OF CONSERVATION PROGRAM EVALUATION

5.1 Results of Program Evaluation

Figure 9 shows annual water demand with no conservation, plumbing code only, and Program D. Table 13 shows the savings in 5 year increments for Program D. The savings in Table 13 are just from the conservation programs alone and do not include the plumbing code savings. There are many factors that contribute to the drop in projected demand from 2005 to 2009, including water conservation (Program D), the economic downturn, weather, and local, regional and state-wide conservation campaigns.

Figure 9: Long Term Demands with Conservation Programs

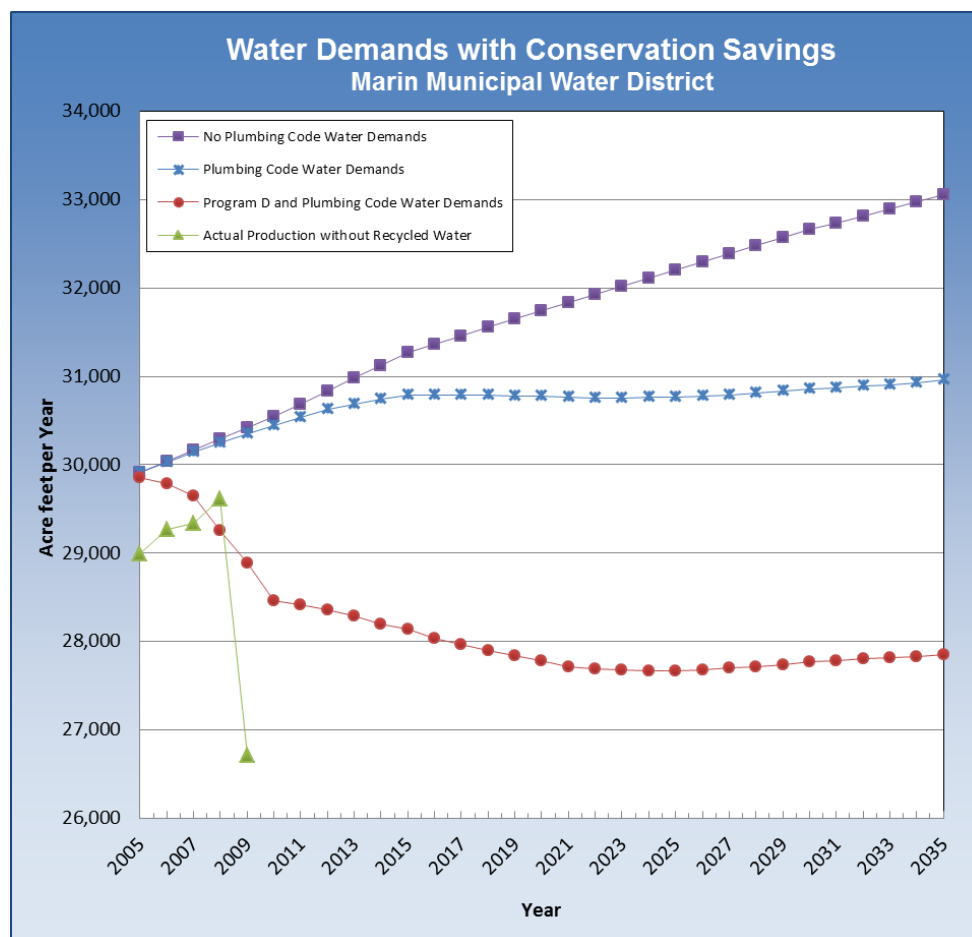


Table 13: Long Term Conservation Program Savings

Water Conservation Savings (AF/Yr) Marin Municipal Water District						
Conservation Program	2010	2015	2020	2025	2030	2035
Program D	1,977	2,656	2,994	3,099	3,089	3,108

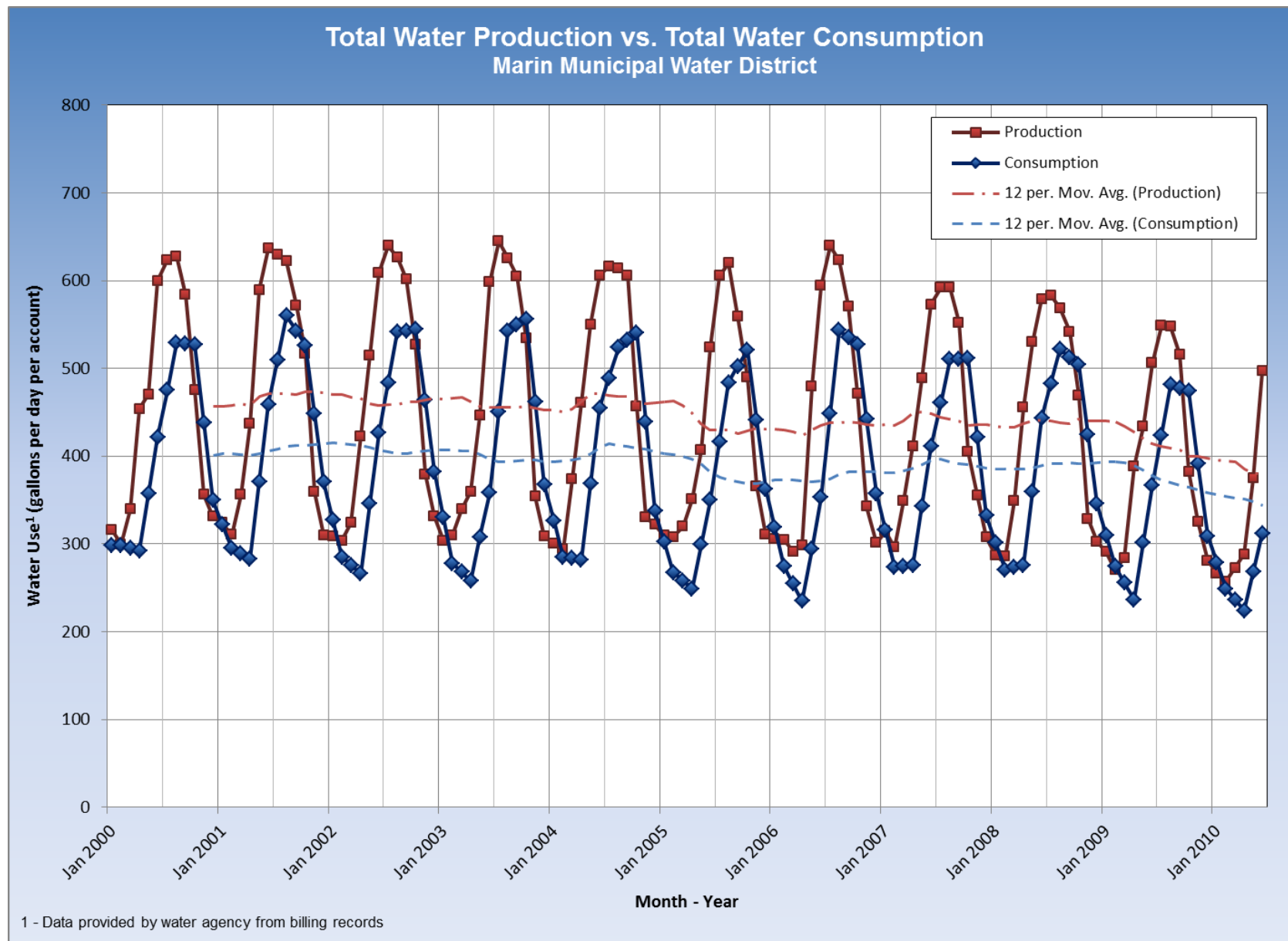
6. CONCLUSIONS

6.1 Future Demands and Per Capita Use with Planned Conservation Program

The MMWD service area has a relatively high portion of residential water use and a modest amount of outdoor water use. Consequently, residential conservation programs produce the most savings. MMWD's service area is not a heavy manufacturing sector so the conservation potential in the commercial sector is relatively low. Overall conclusions are:

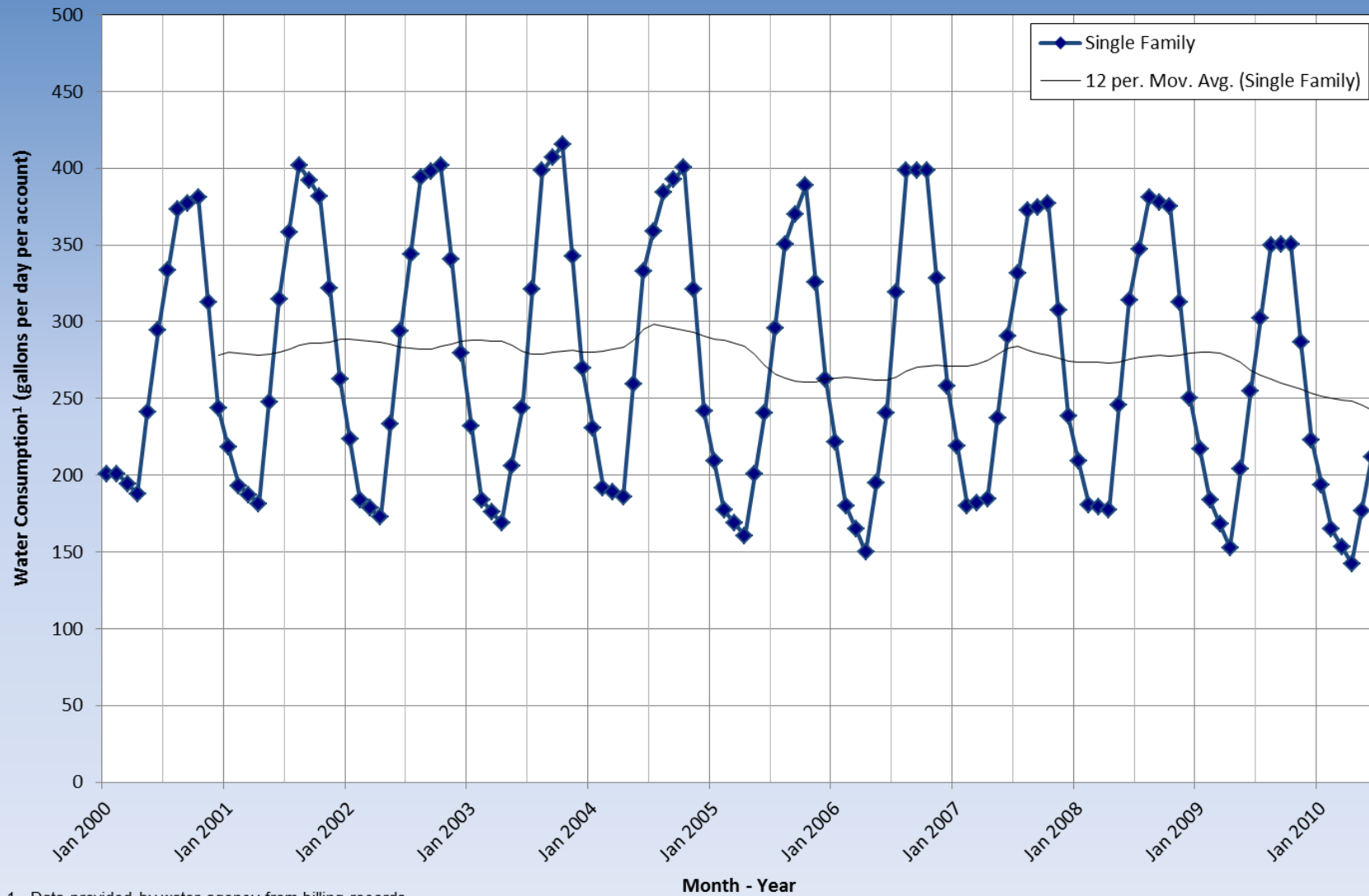
- The decrease in demand for MMWD compared to the water demand projections in the 2005 UWMP and the Demand and Water Conservation Measure Analysis completed by MWM was due to the reduction in population projections and change to lower water factors for each customer category used to project the water use for each customer category. The water factors decreased compared to the 2007 and 2009 studies completed by MWM.
- Water savings from implementation of MMWD Conservation Master Plan Program #3 (Program D) would reduce water needs in 2035 by about 10percent (3,108 AF/Yr) as shown on Table 13) when compared to 2035 water demand without the plumbing code.
- More than half of the conservation potential in 2035 is in reducing indoor use; the rest is outdoor use reduction potential.
- According to the preliminary analysis MMWD will meet both the 2015 and 2020 water use targets with the planned MMWD Water Conservation Master Plan Program #3 (Program D) which is the current MMWD Board adopted conservation program. Based on Tables 1 and 2 provided in Section 3 of this report, the SBx7-7 year 2020 water use reduction target of 125 gallons per capita per day (gpcd) will be achieved by Program #3 (Program D). The MMWD projected per capita water use is 125 gpcd, in the year 2020.

APPENDIX A - WATER USE GRAPHS FOR PRODUCTION AND CUSTOMER CATEGORIES



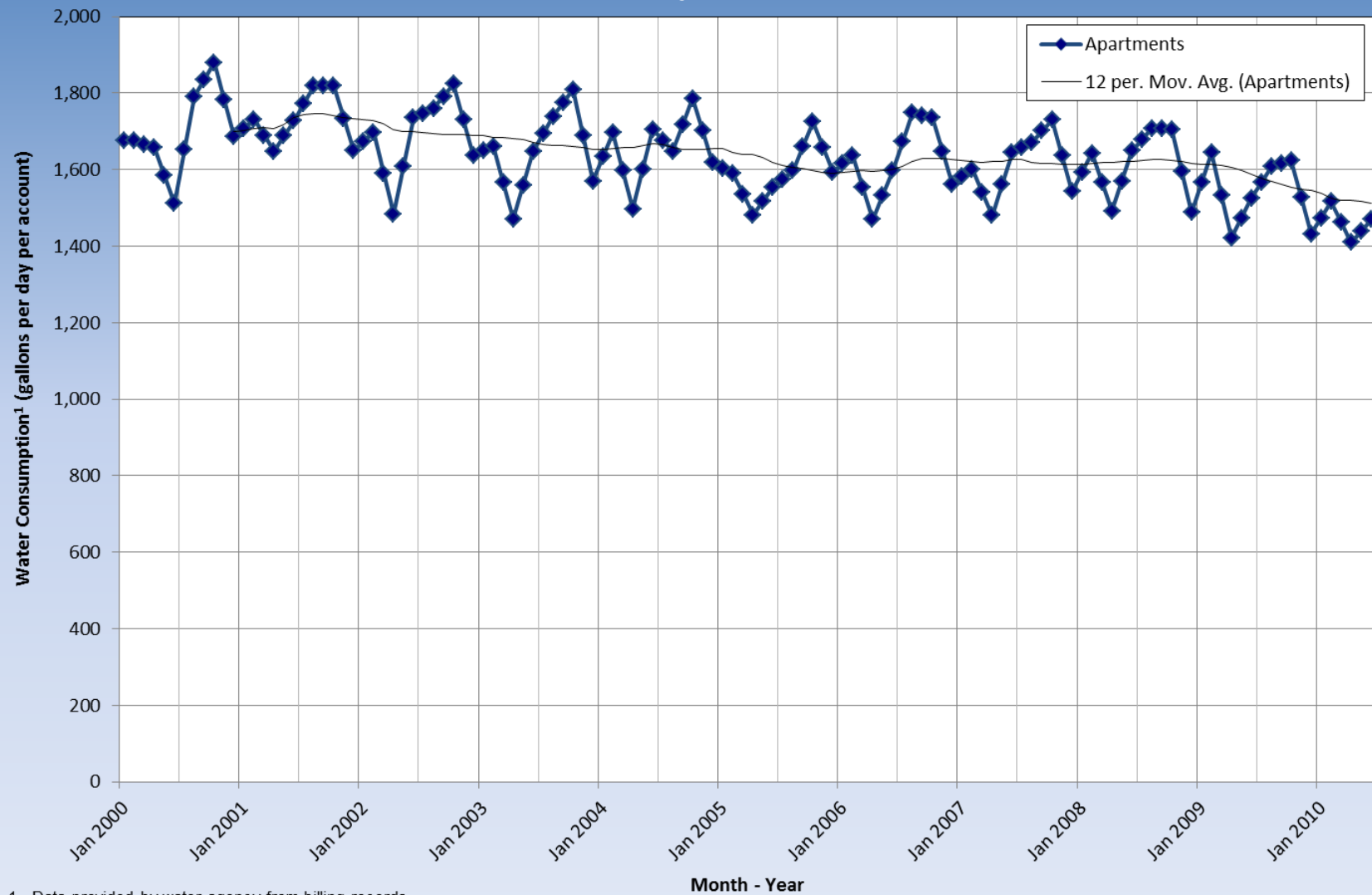
Water Consumption

Customer Category: Single Family
Marin Municipal Water District



1 - Data provided by water agency from billing records

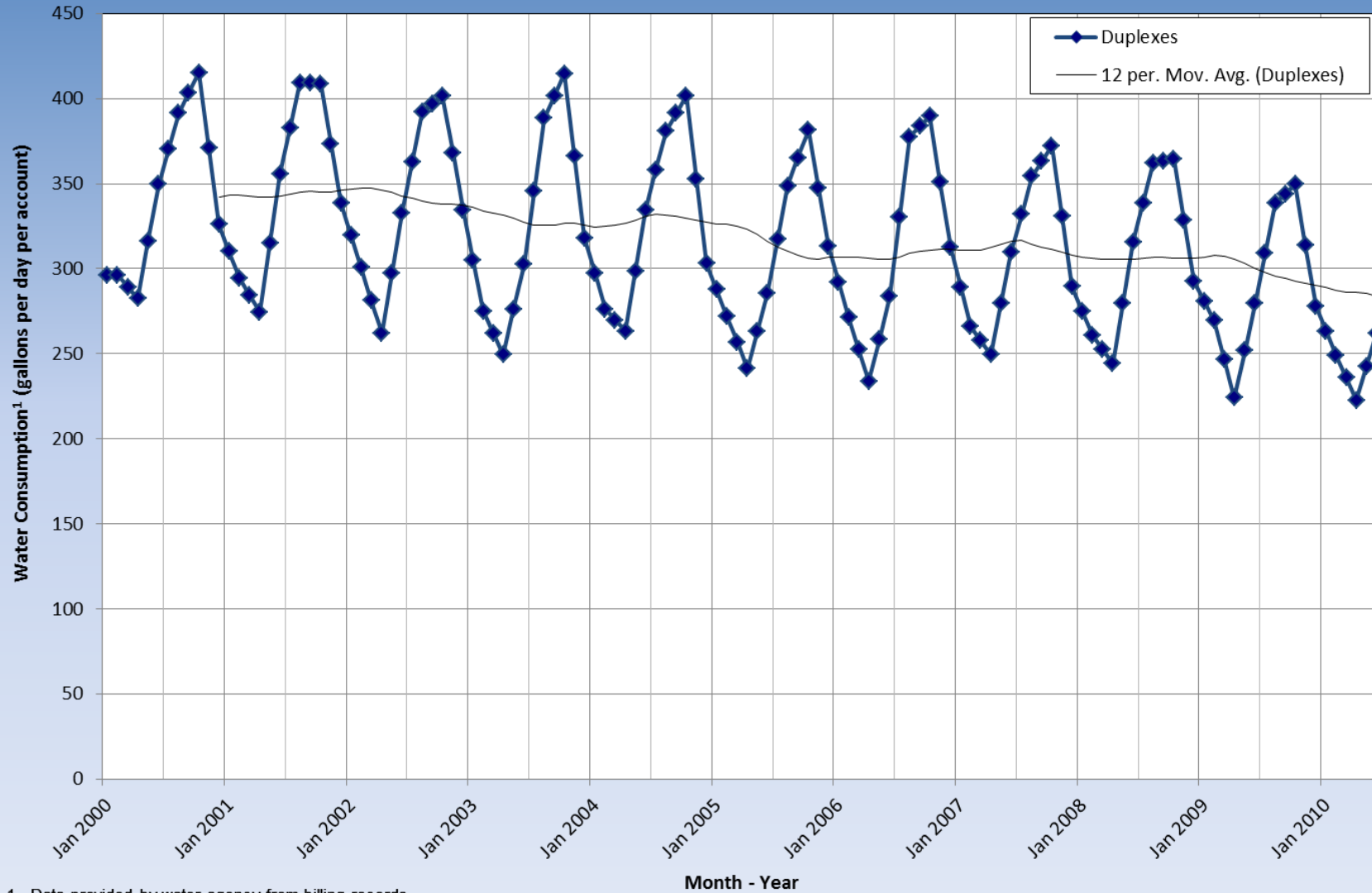
Water Consumption Customer Category: Apartments Marin Municipal Water District



1 - Data provided by water agency from billing records

Water Consumption

Customer Category: Duplexes
Marin Municipal Water District

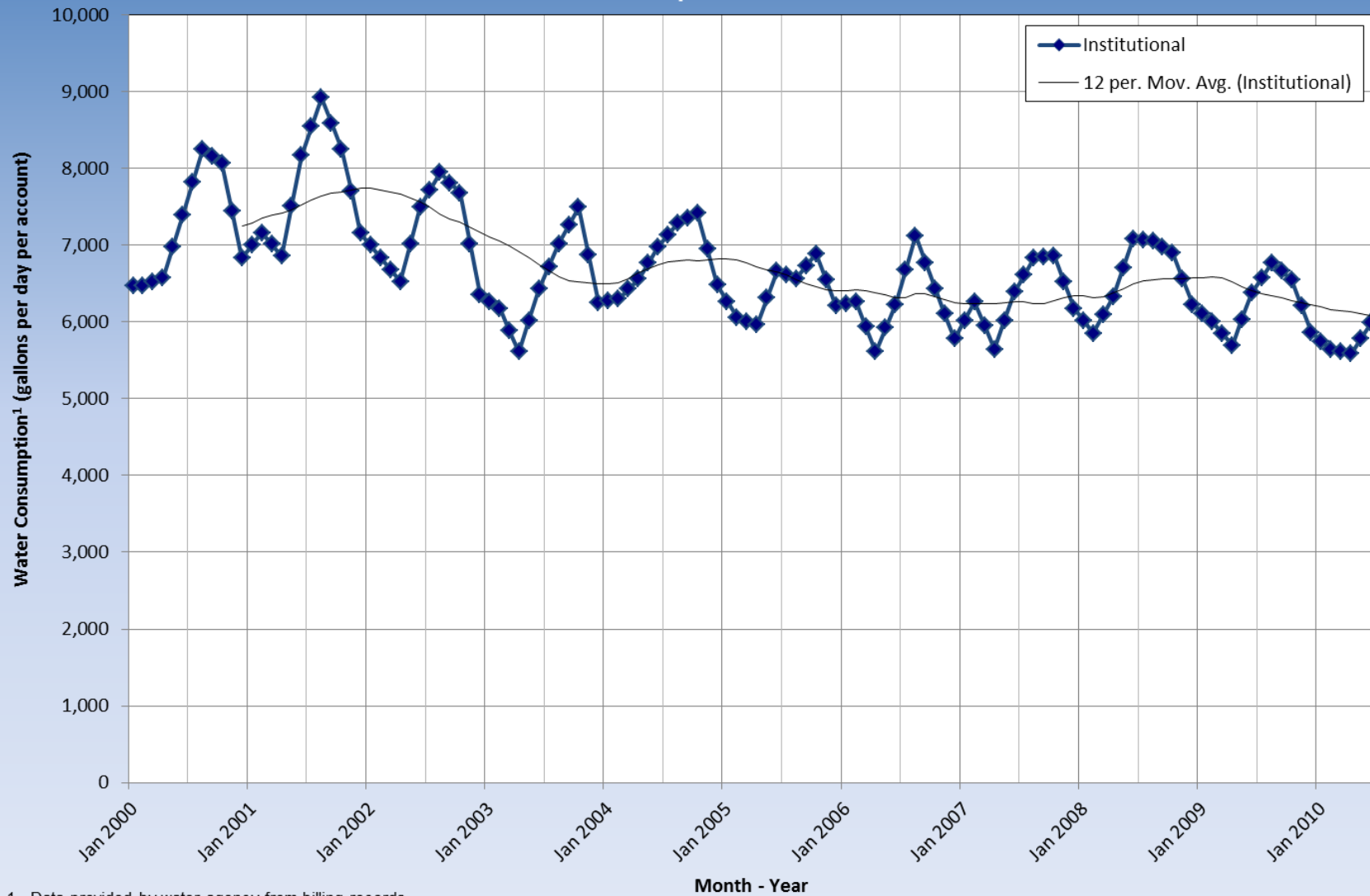


1 - Data provided by water agency from billing records

Water Consumption

Customer Category: Institutional

Marin Municipal Water District

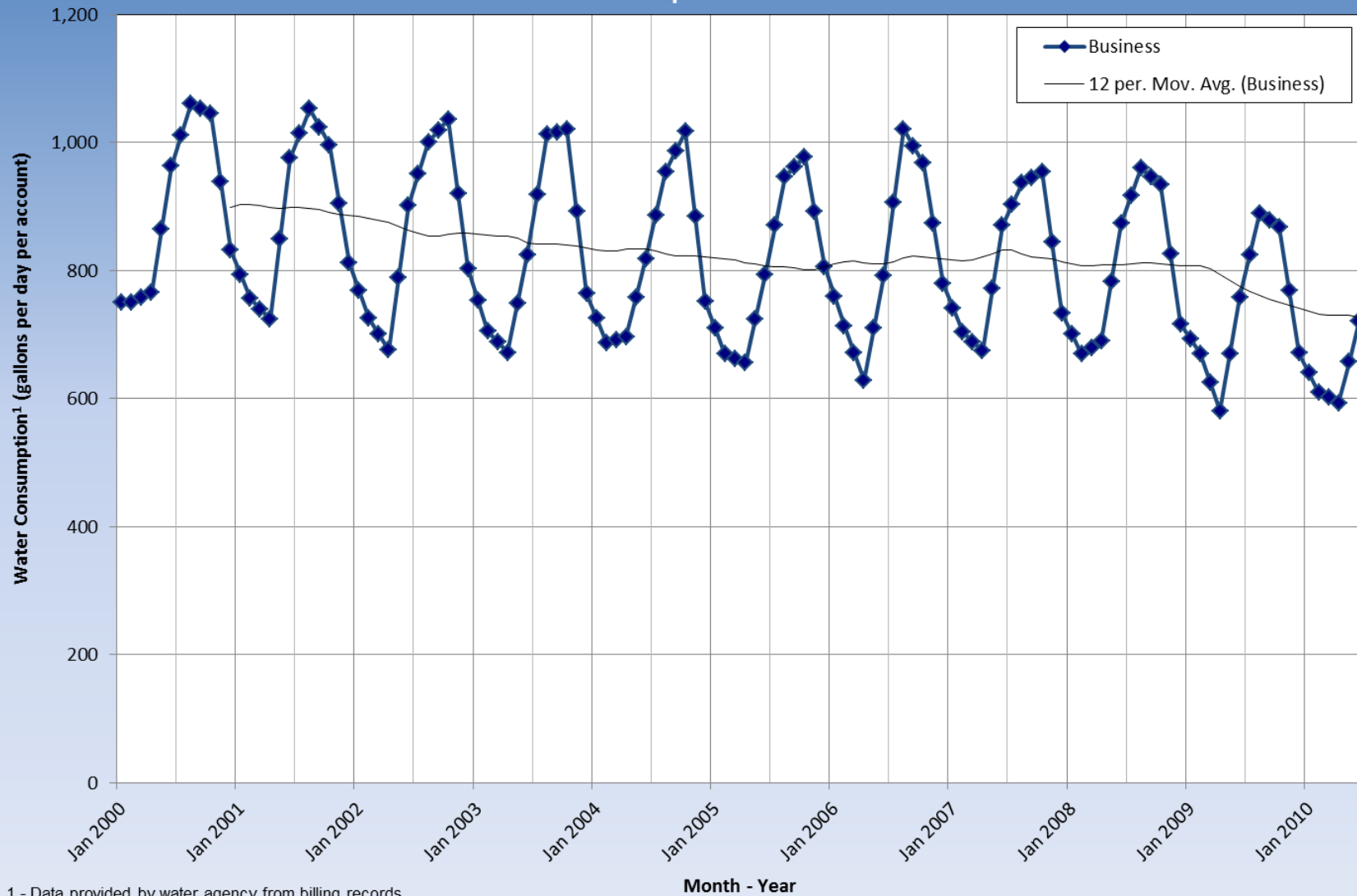


1 - Data provided by water agency from billing records

Water Consumption

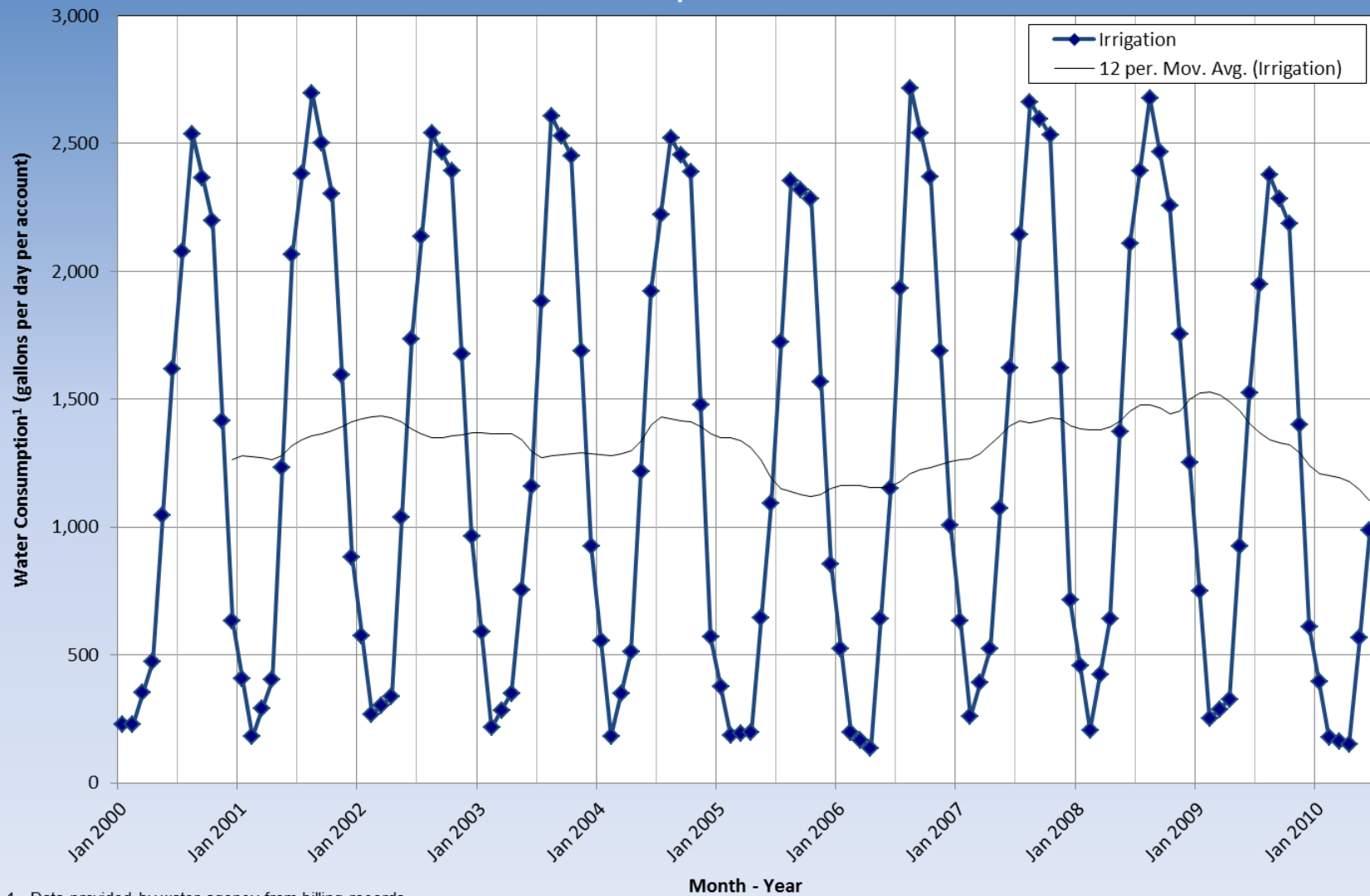
Customer Category: Business

Marin Municipal Water District



1 - Data provided by water agency from billing records

Water Consumption Customer Category: Irrigation Marin Municipal Water District

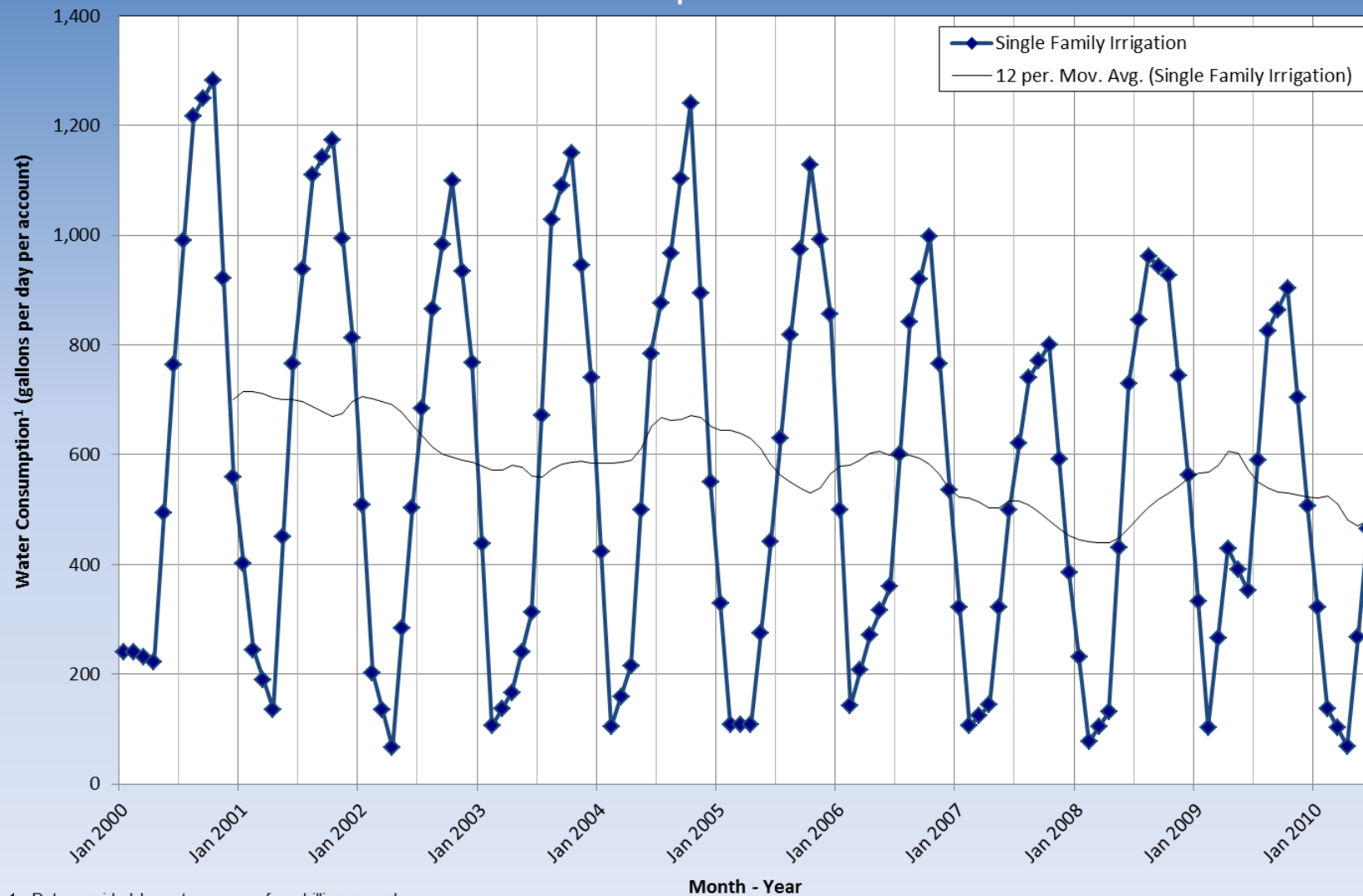


1 - Data provided by water agency from billing records

Water Consumption

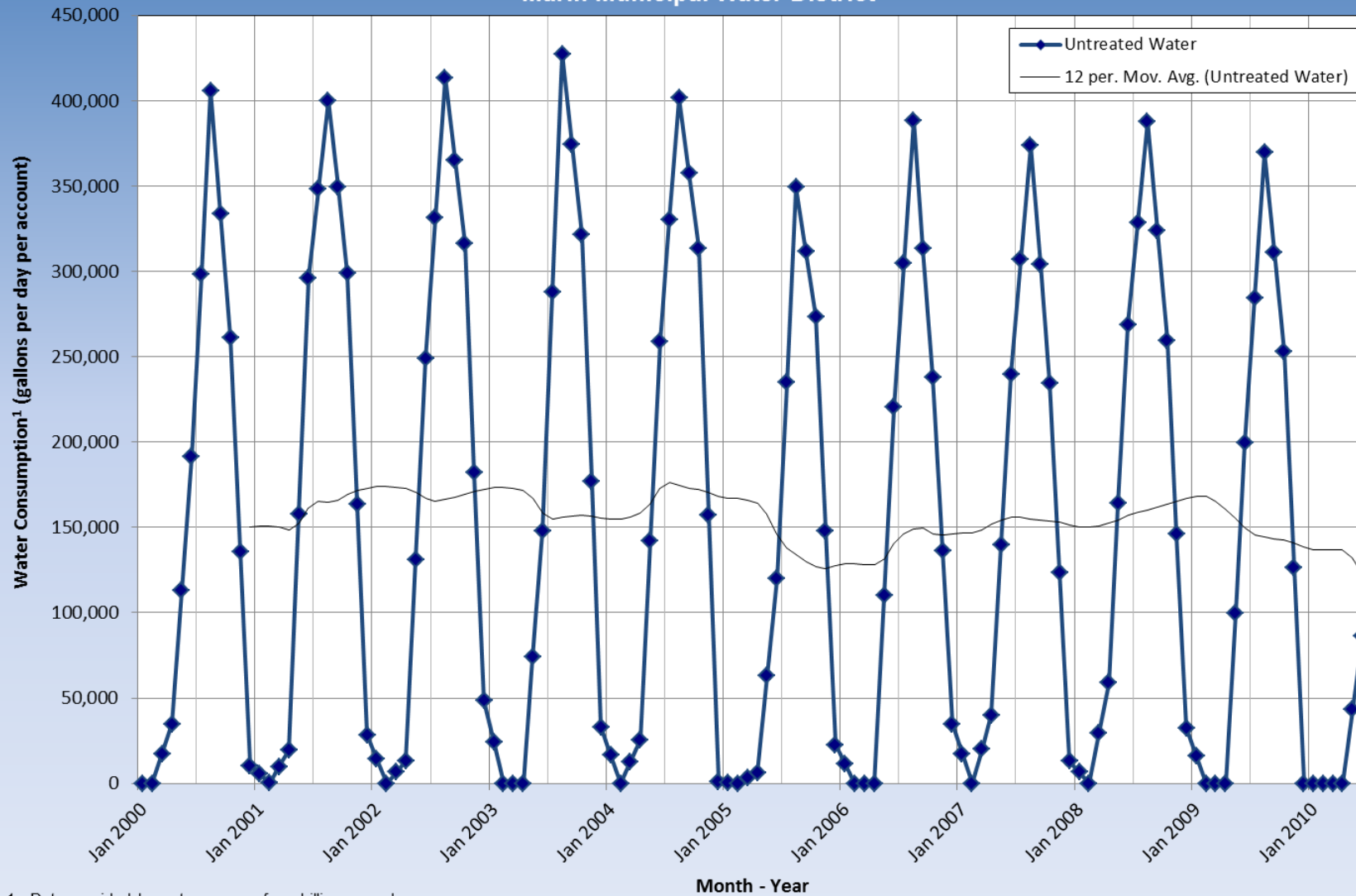
Customer Category: Single Family Irrigation

Marin Municipal Water District



Water Consumption

Customer Category: Untreated Water
Marin Municipal Water District



1 - Data provided by water agency from billing records

APPENDIX B - CONSERVATION MEASURE DESCRIPTIONS

Conservation Measure Descriptions Marin Municipal Water District			
Measure No.	Customer Sector	Name of Measure	Description
T1-1a	SF, MF	Residential Water Surveys - Indoor	This is the indoor component of indoor and outdoor water surveys for existing single-family and multi family residential customers. Normally those with high water use are targeted and provided customized report to homeowner.
T1-1b	SF, MF	Residential Water Surveys - Outdoor	This is the outdoor component of indoor and outdoor water surveys for existing single-family and multi family residential customers. Normally those with high water use are targeted and provided customized report to homeowner.
T1-3	SYSTEM	UFW Reduction	MMWD will increase efforts to find and repair leaks in the distribution system and take other actions (such as meter replacement) to reduce water losses. A ten year program to reduce unaccounted for water by 3.0 percent is proposed for this measure.
T1-4	IRR	Water Budgets	90% - 100% of all irrigators of landscapes with separate irrigation accounts would receive a monthly or bi-monthly irrigation water use budget.
T1-5	COM, INS	Large Landscape Conservation Audits	All public and private irrigators of landscapes larger than one acre would be eligible for free landscape water audits upon request.
T1-6	SF	Clothes Washer Rebate	Homeowners would be eligible to receive a rebate on a new water efficient clothes washer.
T1-7	SF, New SF	Public Information Program	Public education would be used to raise awareness of other conservation measures available to customers. Programs could include poster contests, speakers to community groups, radio and television time, and printed educational material such as bill inserts, etc.
T1-8	COM, INS	Commercial Water Audits	High water use accounts would be offered a free water audit that would evaluate ways for the business to save water and money.
T1-9	SF	Single Family Residential ULF Toilet Rebate	Homeowners would be required to replace an existing high volume toilet with a 1.6 gallon per flush efficient toilet when name account changes.
T1-10	RMF	Multi family Residential ULF Toilet Rebate	Homeowners would be required to replace an existing high volume toilet with a 1.6 gallon per flush efficient toilet when name account changes.
T1-14a	SF	Single Family Toilet Ordinance	A single family toilet ordinance to replace existing toilets.
T1-14b	MF	Multifamily Toilet Ordinance	A multifamily toilet ordinance to replace existing toilets.

Notes:

RSF = Residential Single Family

RMF = Residential Multi Family

NRSF = New Residential Single Family

COM = Business

INS = Institutional

IND = Industrial

Conservation Measure Descriptions Marin Municipal Water District			
Measure No.	Customer Sector	Name of Measure	Description
T2-1	Existing Customers SF	Rain-sensor (shut off device) retrofit on irrigation controllers	Agency pays for the \$40 rain sensor, homeowner pays for the optional installation (\$35).
T2-2	Existing Customers INS	San Quentin Toilets	Provide a \$150 rebate for toilet replacement at San Quentin. Replace a total of 1,000 toilets over 5 years
T2-3	Existing Customers: SF & MF	High Efficiency Toilet (HET)	Provide a \$250 rebate or voucher for the installation of a high efficiency toilet (HET). HET are defined as any toilet to flush 20% less than an ULFT and include dual flush technology. Rebate amounts would reflect the incremental purchase cost.
T2-4	Existing Customers: SF & Condo	Homeowner Landscaping and Irrigation Classes	Sponsor classes at stores where irrigation equipment is sold or other suitable venues on selection and installation of efficient plant material and irrigation equipment (drip irrigation, smart controllers, low volume sprinklers, etc.).
T2-5	Existing Customers MF	Coin-Op Washing Machine Rebate	Provide a \$400 rebate for efficient coin-op washing machines to existing apartment complexes over a certain size with a common laundry room.
T2-6	Existing Customers SF, Condo, MF, CII, IRR	Financial Incentives/ Rebates for Irrigation Upgrades including Smart Irrigation Controllers	For SF, CONDO, MF, CII, and IRR customers with landscape, provide for rebates towards the purchase and installation of selected types of irrigation equipment upgrade including low volume sprinkler heads, check valves, smart irrigation controllers. Rebate is \$450 for residential accounts and up to \$650 for mixed use accounts and up to \$3,500 for dedicated irrigation accounts. Provide up to \$450 for SF, and up to \$3,500. Assume average rebate claimed equates to \$1,500 for non-Residential accounts.
T2-7	Existing Customers: CII	Hotel retrofit (w/financial assistance) - CII Existing	Following a free water audit, offer the hotel a rebate for equipment identified that would save water. Provide a rebate schedule for certain efficient equipment such as air-cooled ice machines, steamers, washers, cooling towers, and spray rinse valves.
T2-8	Existing Customers: CII	CII Rebates - replace inefficient water using equipment	Provide a rebate for a standard list of water efficient equipment. Included would be x-ray machines, icemakers, air-cooled ice machines, steamers, washers, spray valves, efficient dishwashers, replace once through cooling, add conductivity meters on cooling.
T2-9	Existing Customers: CII	0.5 gal/flush urinals in existing buildings	Provide a \$350 rebate for existing buildings to encourage installation of 0.5 gal/flush urinals rather than the current standard of 1.0 gal/flush models.
T2-10	SF, CONDO, MF, COM, INS	Install AMS and Leak Detection Customer Notification	Install AMS and leak detection meters. A call or e-mail will be placed to customers if there is a leak. Will be as automated as possible by a computer program, use 1 full time staff person. Cost will be approximately \$100,000 per year.

Conservation Measure Descriptions Marin Municipal Water District			
Measure No.	Customer Sector	Name of Measure	Description
ND1	New Customers: SF, CONDO, RMF, COM, INS	Rain-sensor shut off device on irrigation controllers	Require-sensor or rain shut off devices with all new automatic irrigation system installations on new homes and buildings.
ND2	New Customers: SF, CONDO, RMF, COM, INS	Smart Irrigation Controller	Require developers to provide the latest state of the art SMART irrigation controllers. These SMART controllers have on-site temperature sensors or rely on a signal from a central weather station that modifies irrigation times at least weekly.
ND3	New Customers: SF, CONDO, RMF, COM, INS	High Efficiency Toilet (HET)	Require developers to install a high efficiency toilet (HET). HET are defined as any toilet to flush 20% less than an ULFT and include dual flush technology.
ND4	New Customers: SF, CONDO, RMF, COM, INS	Dishwasher New Efficient	Require developers to install an efficient dishwasher (meeting certain water efficiency standards, such as gallons/load).
ND5	New Customers: SF, CONDO, RMF, COM, INS	Clothes washing machines requirement for new residential	Building departments would be responsible to ensure that an efficient washer was installed before new home or building occupancy.
ND6	New Customers: SF, CONDO, RMF, COM, INS	Hot Water on Demand	Require developers to equip new homes or buildings with a hot water on demand system or tankless hot water heaters, such as those made by Metland Systems and others. These systems use a pump placed under the sink to recycle water sitting in the hot water pipes to the
ND7	New Customers: SF, CONDO, RMF, COM, INS	High efficiency faucets and showerheads	Require developers to install lavatory faucets that flow at no more than 1.5 gpm, kitchen faucets at 2.2 gpm, showerheads at 2.0 gpm
ND8	New Customers: SF, CONDO, RMF, COM, INS	Landscape and irrigation requirements	Enforce a regulation that specifies that homes or buildings be landscaped according to Xeriscape principals, with appropriate irrigation systems. (Combines with Smart Controller listed above). Goal is overall 25% in irrigation water use (measure 2 and 9 combined).
ND9	New Customers: MF	Multi Family Submetering	Require all new multi-family units to provide sub-meters on individual units. To help reduce financial impacts on tenants, regulators would be adopted that specify acceptable methods of metering and billing.
ND10	New Customers: CII	Offer new accounts reduced connection fees for installing efficient process equipment for selected businesses (restaurants, laundry mat, food/groceries and hospital)	Offer reduced water and sewer connection fees to new facilities to install water efficient equipment in new facilities that goes above and beyond the building code requirements. Model program after Santa Rosa's BAT program.
ND11	New Customers: CII	0.5 gal/flush urinals in new buildings	Require that new building be fitted with 0.5 gpf urinals rather than the current standard of 1.0-gal/flush models.

APPENDIX C - CONSERVATION MEASURES IN EACH PROGRAM

Conservation Measures in each Program Marin Municipal Water District					
Measure Name	Program A	Program B	Program C	Program D	Program E
CUWCC #1a - Residential Water Surveys Interior	✓	✓	✓	✓	
CUWCC #1a - Residential Water Surveys Interior - No AMS ProgE					✓
CUWCC #1a - Residential Water Surveys Interior - AMS Program E					✓
CUWCC #1b - Residential Water Surveys Exterior	✓	✓	✓	✓	
CUWCC #1b - Residential Water Surveys Exterior - No AMS_Prog E					✓
CUWCC #1b - Residential Water Surveys Exterior - AMS_Prog E					✓
CUWCC #3 - Leak Detection and Repair 1.5% Reduction		✓			
CUWCC #3 - Leak Detection and Repair 2% Reduction			✓		
CUWCC #3 - Leak Detection and Repair 3% Reduction				✓	
CUWCC #3 - Leak Detection and Repair 3.5% Reduction 3 crews					✓
CUWCC #5a - Large Landscape Water Budgets	✓	✓	✓	✓	✓
CUWCC #5a - Large Landscape Water Budgets w/AMS					✓
CUWCC #5b - Large Landscape Audits	✓	✓	✓	✓	✓
CUWCC #6 - Washer Rebates	✓	✓	✓		
CUWCC #6 - Washer Rebates Prog D				✓	
CUWCC #6 - Washer Rebates Prog E					✓
CUWCC #7 - Residential Public Education	✓	✓	✓	✓	✓
CUWCC #9 - Commercial Water Audits	✓	✓	✓		
CUWCC #9 - Commercial Water Audits Prog D				✓	✓
CUWCC #9 - Commercial Water Audits w/AMS Prog E					✓
CUWCC #14a - RSF Toilet Replacement	✓	✓	✓	✓	✓
CUWCC #14b - RMF Toilet Replacement	✓	✓	✓	✓	✓
Tier 2 - 1 Rain Sensor Retrofit		✓			
Tier 2 - 1 Rain Sensor Retrofit Intensive			✓	✓	
Tier 2 - 1 Rain Sensor Retrofit Prog E					✓
Tier 2 - 2 San Quentin Toilet Replacement		✓	✓	✓	✓
Tier 2 - 3 High Efficiency Toilets	✓	✓			
Tier 2 - 3 High Efficiency Toilets intensive			✓	✓	
Tier 2 - 3a High Efficiency Toilets Prog E					✓
Tier 2 - 3b High Efficiency Toilets Prog E					✓
Tier 2 - 4 Homeowner Landscape Classes		✓			
Tier 2 - 4 Homeowner Landscape Classes Intensive			✓	✓	✓
Tier 2 - 5 MF Washer Rebate Coin-Op Machines		✓			
Tier 2 - 5 MF Washer Rebate Coin-Op Machines Intensive			✓	✓	
Tier 2 - 5 MF Washer Rebate Coin-Op Machines Intensive_Prog E					✓
Tier 2 - 6 Financial Incentives/Rebates for Irrigation Upgrades	✓	✓			
Tier 2 - 6 Financial Incentives/Rebates for Irrigation Upgrades Intensive			✓		
Tier 2 - 6 Financial Incentives/Rebates for Irrigation Upgrades Prog D				✓	
Tier 2 - 6 Financial Incentives/Rebates for Irrigation Upgrades Prog D					✓
Tier 2 - 7 Hotel Retrofit		✓			
Tier 2 - 7 Hotel Retrofit Intensive			✓	✓	✓
Tier 2 - 8 CII Replace Inefficient Equipment		✓	✓	✓	✓
Tier 2 - 9 Existing Commercial Urinals	✓	✓			
Tier 2 - 9 Existing Commercial Urinals Intensive			✓	✓	
Tier 2 - 9 Existing Commercial Urinals Prog E					✓
Tier 2 - 10 Install AMS Leak Detection Notification					✓
Tier 2 - ND1 Rain Sensor Retrofit		✓	✓	✓	✓
Tier 2 - ND2 Smart Irrigation Controller		✓	✓	✓	✓
Tier 2 - ND3 High Efficiency Toilets		✓	✓	✓	✓
Tier 2 - ND4 Dishwasher New Efficient		✓	✓	✓	✓
Tier 2 - ND5 Clothes Washing Machine Requirement		✓	✓	✓	✓
Tier 2 - ND6 Hot Water on Demand		✓	✓	✓	✓
Tier 2 - ND7 High Efficiency Faucets and Showerheads		✓	✓	✓	✓
Tier 2 - ND8 Landscape and Irrigation Requirements		✓	✓	✓	✓
Tier 2 - ND9 MF Submetering		✓	✓	✓	✓
Tier 2 - ND10 New CII Reduced Connection Fees for Efficient Equipment		✓	✓	✓	✓
Tier 2 - ND11 New Commercial Urinals		✓	✓	✓	✓

APPENDIX D - ASSUMPTIONS FOR MEASURES EVALUATED IN THE DSS MODEL

Conservation Measure Assumptions Marin Municipal Water District						
	Residential Interior Water Audits	Residential Interior Water Audits - No AMS	Residential Interior Water Audits - AMS	Residential Exterior Water Audits	Residential Exterior Water Audits - No AMS	Residential Exterior Water Audits - AMS
Measure Number	T1-1a	T1-1a	T1-1a	T1-1b	T1-1b	T1-1b
Applicable Customer Classes	SF/CONDO*	SF/CONDO/RMF	SF/CONDO/RMF	SF/CONDO*	SF/CONDO/RMF	SF/CONDO/RMF
Included in Program Package (A, B, C or D)	A,B,C,D	E	E	A,B,C,D	E	E
Applicable End Uses	Indoor	Indoor	Indoor	Outdoor	Outdoor	Outdoor
Water Use Reductions For Targeted End Uses	5%	5%	7%	10%	10%	12% Outdoor, 35% Leakage
Evaluation Start Year	2006	2006	2015	2006	2006	2015
Evaluation End Year	2035	2014	2035	2017	2014	2035
Market Penetration Goal, %	30%	10%	22%	30%	10%	22%
Measure Life (years)	7	7	10	7	7	10
Utility Unit Cost for SF/CONDO accounts, \$/unit	\$ 120.00	\$ 120.00	\$ 120.00	\$ 40.00	\$ 120.00	\$ 120.00
Utility Unit Cost for MF accounts, \$/unit	-	\$ 120.00	\$ 120.00	-	\$ 120.00	\$ 120.00
Utility Cost	-	-	-	\$ -	-	-
Customer Unit Cost, \$/unit	\$ 10.00	\$ 10.00	\$ 10.00	\$ 100.00	\$ 5.00	\$ 5.00
Annual Utility Admin & Marketing Cost, % of total annual cost	25%	25%	25%	25%	25%	25%
Affected Units	dwelling unit	accounts	accounts	dwelling unit	accounts	accounts
Comments	*BMP Complete for RMF	BMP complete for RMF, but MMWD has elected to continue to offer surveys to RMF customers.	MMWD currently plans to run RMF surveys in the future. \$10 customer cost assumed because all major items inspected during surveys have a rebate or offer in other programs. \$120 cost is a mixture of in house and contracted out audits	No cost to MMWD, they were purchased by San Quentin. \$100 is for labor of installation of the toilet. The toilets have been purchased already.	MMWD currently plans to run RMF surveys in the future. \$120 utility cost is a mixture of in house and contracted out audits. The \$5 customer cost is assumed because all major items inspected during surveys have a rebate or offer in other programs. If during the survey, MMWD recommend a irrigation system upgrade, the customer costs would be covered under the Financial Incentives for Irrigation Upgrades, please see measure Tier 2-6.	MMWD currently plans to run RMF surveys in the future. \$120 utility cost is a mixture of in house and contracted out audits. The \$5 customer cost is assumed because all major items inspected during surveys have a rebate or offer in other programs. If during the survey, MMWD recommend a irrigation system upgrade, the customer costs would be covered under the Financial Incentives for Irrigation Upgrades, please see measure Tier 2-6.

Conservation Measure Assumptions
Marin Municipal Water District

	Leak Detection and Repair 1.5% Reduction	Leak Detection and Repair 2% Reduction	Leak Detection and Repair 3% Reduction	Leak Detection and Repair 3.7% Dedicated 3rd Crew	Landscape Water Budgets	Landscape Water Budgets with AMS
Measure Number	T1-3	T1-3	T1-3	T1-3	T1-5a	T1-5a
Applicable Customer Classes	SF, CONDO	MF, COM, INS	All	System	IRR	IRR
Included in Program Package (A, B, C or D)	B	C	D	E	A,B,C,D,E	E
Applicable End Uses	UFW	UFW	UFW	UFW	Irrigation	Irrigation
Water Use Reductions For Targeted End Uses	1.5%	2.0%	3%	3.7%	15%	20%
Evaluation Start Year	2008	2008	2008	2009	2006	2015
Evaluation End Year	2035	2035	2035	2035	2014	2035
Market Penetration Goal, %	See comment	See comment	See comment	See comment	90%	154%*
Measure Life (years)	Permanent	Permanent	Permanent	Permanent	10	15
Utility Unit Cost for SF/CONDO accounts, \$/unit		\$ -		NA	-	-
Utility Unit Cost for MF accounts, \$/unit	\$ -	\$ 315.00		NA	-	-
Utility Cost	\$ -	\$ 315.00	\$272,700 Per Year 2008 to 2010, \$172,000 Per Year 2011 to 2037	\$510,600 Per Year 2009 to 2011, \$420,144 Per Year 2011 to 2035	\$150/account	\$50/account
Customer Unit Cost, \$/unit	-	\$ -	-	-	\$ -	\$ -
Annual Utility Admin & Marketing Cost, % of total annual cost	NA	NA	NA	NA	15%	10%
Affected Units	NA	NA	NA	NA	Irrigation accounts	Irrigation accounts
Comments	10-year program to reduce UFW to 9.2% , then annual maintenance	Direct Install program Added Commerical and Institutional categories in year 2009. Cost is \$315 per toilet.	10-year program to reduce UFW by 3.0%, then annual maintenance	10-year program to reduce UFW by 3.7%, then annual maintenance	Complete by 2014 (10 years). Budgets without the assistance of AMS System using the current plan review process to create budgets. MMWD staff changed cost to \$150 per account based on actual cost using current methods	Budgets with assistance of AMS System. The market penetration of 154% is due to the measure life. MMWD must repeat account budgets to keep them current. Based on using fully automated processes to produce and distribute budgets.

Conservation Measure Assumptions
Marin Municipal Water District

	Large Landscape Audits	Washer Rebates	Washer Rebates - Prog D	Washer Rebates - Prog E	Public Education	CII Audits
Measure Number	T1-5b	T1-6	T1-6	T1-6	T1-7	T1-9
Applicable Customer Classes	COM/INS	SF/Condo	SF/Condo	SF/CONDO	SF/Condo	COM/INS
Included in Program Package (A, B, C or D)	A,B,C,D,E	A,B,C	D	E	A,B,C,D,E	A,B,C
Applicable End Uses	Irrigation	Laundry	Laundry	Laundry	All	All
Water Use Reductions For Targeted End Uses	15%	34%	34%	51%	15%	12%
Evaluation Start Year	2006	2006	2006	2006	2006	2006
Evaluation End Year	2035	2010	2010	2015	2035	2014
Market Penetration Goal, %	7.2% COM, 13.5% INS	26%	40%	25%	100%	8%
Measure Life (years)	10	Permanent	Permanent	Permanent	2	Permanent
Utility Unit Cost for SF/CONDO accounts, \$/unit	-	\$ 75.00	\$ 75.00	\$ 125.00	\$ 5.00	-
Utility Unit Cost for MF accounts, \$/unit	-	-	-	-	-	-
Utility Cost	\$300/account	-	-	-	-	\$ 1,000.00
Customer Unit Cost, \$/unit	\$ 1,500.00	\$ 200.00	\$ 200.00	\$ 200.00	-	\$ 2,000.00
Annual Utility Admin & Marketing Cost, % of total annual cost	30%	30%	30%	30%	25%	50%
Affected Units	Assume applies to 63 large landscape accounts (already completed) using > 0.25 acre-feet/yr	per dwelling unit	per dwelling unit	per dwelling unit	per dwelling unit	CII accounts
Comments	Audits focus on educating contractors in basic irrigation scheduling and management practices. Renew audits in 2016 and 2026 due to 10 year measure life	BMP 6 complete, but continue to 2010	BMP 6 complete, but continue to 2010	BMP 6 complete, but continue to 2015. Lowered penetration rate to 1,400 per year based on current MMWD program goals, but increased length of program to 2015	On-going public education effort including billing notices, advertising and marketing, press releases, and other public outreach methods.	Program ends in 2014, to allow a switch to conducting CII Audits with the help of information from AMS in year 2015.

Conservation Measure Assumptions
Marin Municipal Water District

	CII Audits - Prog D	CII Audits with AMS	SF Toilet Ordinance	MF Toilet Ordinance	Rain Sensor Retrofit	Rain Sensor Retrofit - Intensive
Measure Number	T1-9	T1-9	T1-14a	T1-14b	T2-1	T2-1
Applicable Customer Classes	COM/INS	COM/INS	SF	MF	SF, CONDO	SF, CONDO
Included in Program Package (A, B, C or D)	D,E	E	A,B,C,D,E	A,B,C,D,E	B	C,D
Applicable End Uses	All	All	Toilet	Toilet	Irrigation	Irrigation
Water Use Reductions For Targeted End Uses	12%	15% all uses, and 35% on external leaks	60%	60%	9%	9%
Evaluation Start Year	2006	2015	2006	2006	2008	2008
Evaluation End Year	2014	2035	2007	2007	2012	2017
Market Penetration Goal, %	16%	42%	Equals service change rate	Equals service change rate	10%	20%
Measure Life (years)	Permanent	Permanent	Permanent	Permanent	10	10
Utility Unit Cost for SF/CONDO accounts, \$/unit	-	-	-	-	\$ 40.00	\$ 40.00
Utility Unit Cost for MF accounts, \$/unit	-	-	-	-	--	--
Utility Cost	\$ 1,000.00	\$ 1,000.00	-	-	--	\$ -
Customer Unit Cost, \$/unit	\$ 2,000.00	\$ 2,000.00	\$ 75.00	\$ 75.00	\$ 35.00	\$ 35.00
Annual Utility Admin & Marketing Cost, % of total annual cost	50%	50%	\$15,600 per year	\$2,000 per year	10%	10%
Affected Units	CII accounts	CII accounts	per toilet	per toilet	dwelling unit	dwelling unit
Comments	Program ends in 2014, to allow a switch to conducting CII Audits with the help of information from AMS in year 2015.	Start in 2015 after installation of AMS. Assume internal MMWD audit costs.	Ordinance was changed to be a HET rebate program in the year 2007.	Ordinance was changed to be a HET rebate program in the year 2007.		

Conservation Measure Assumptions
Marin Municipal Water District

	Rain Sensor Retrofit - Prog E	San Quentin Toilets	High Efficiency Toilet	High Efficiency Toilet - Intensive	Residential High Efficiency Toilet Rebates	CII High Efficiency Toilet Direct Install + Rebates
Measure Number	T2-1	T2-2	T2-3	T2-3	T2-3a	T2-3b
Applicable Customer Classes	SF, CONDO	CII Existing	SF, CONDO, MF	SF, CONDO, MF, COM, INS	SF, CONDO	MF, COM, INS
Included in Program Package (A, B, C or D)	E	B,C,D,E	A,B	C,D	E	E
Applicable End Uses	Irrigation	Toilets	Toilets	Toilets	Toilets	Toilets
Water Use Reductions For Targeted End Uses	9%	46%	50%	50% to 52%	50% to 52%	50%
Evaluation Start Year	2008	2008	2008	2007	2008	2008
Evaluation End Year	2015	2009	2016	2016	2019	2019
Market Penetration Goal, %	20%	50%	20%	30%	30%	63% RMF, 16% COM, 18% INS
Measure Life (years)	10	Permanent	Permanent	Permanent	Permanent	Permanent
Utility Unit Cost for SF/CONDO accounts, \$/unit	\$ 40	--	\$ 250	\$ 250	\$ 200	\$ -
Utility Unit Cost for MF accounts, \$/unit	--	--	\$ 150	\$ 150	\$ -	\$ 300
Utility Cost	--	\$ -			\$ -	\$ 300
Customer Unit Cost, \$/unit	\$ 35	\$ 250	\$ 200	\$ 200	\$ 150	\$ 150
Annual Utility Admin & Marketing Cost, % of total annual cost	5%	0%	25%	25%	25%	15%
Affected Units	dwelling unit	NA	NA	dwelling unit	dwelling unit	account
Comments	Admin and Marketing cost decreased to 10% as MMWD plans to combine the Rain Sensors with Program BMP 1b (External Water Surveys). Extended program to 2015. Cost of regular unit is \$14, cost of wireless unit is \$43. Assume average cost of \$40.	No cost to MMWD, toilets were purchased and program entirely run by San Quentin. \$250 is for labor of installation of the toilet. The toilets have been purchased already.	Direct Install program Added Commerical and Institutional categories in year 2009. Cost is \$315 per toilet.		Added Commerical and Institutional categories in year 2009. Start a rebate for \$250 then decrease to \$150 by end of program. Assume rebate average of \$200.	Direct Install program Added Commerical and Institutional categories in year 2009. Cost is \$315 per toilet for direct install. Rebate cost is \$200. Drop from admin cost from 25% to 15% MMWD Contract out.

Conservation Measure Assumptions
Marin Municipal Water District

	Homeowner Landscape Class	Homeowner Landscape Class - Intensive	Coin-Op Washers Rebate	Coin-Op Washers Rebate - Intensive	Coin-Op Washers Rebate - Program E	Financial Incentives for Irrigation Upgrades
Measure Number	T2-4	T2-4	T2-5	T2-5	T2-5	T2-6
Applicable Customer Classes	SF, CONDO	SF, CONDO	MF (5 or more units)	MF (5 or more units)	MF (5 or more units)	SF, CONDO, MF, CII, IRR
Included in Program Package (A, B, C or D)	B	C,D,E	B	C,D	E	A,B
Applicable End Uses	External	External	Laundry	Laundry	Laundry	Irrigation
Water Use Reductions For Targeted End Uses	5%	5%	34%	34%	51%	5% SF/CONDO, 15% OTHER
Evaluation Start Year	2006	2006	2006	2006	2006	2008
Evaluation End Year	2017	2017	2015	2015	2017	2021
Market Penetration Goal, %	5%	10%	15%	25%	25%	SF 5%, Non-SF 15%
Measure Life (years)	Permanent	Permanent	Permanent	Permanent	Permanent	Permanent
Utility Unit Cost for SF/CONDO accounts, \$/unit	1000	1000	\$ -	\$ -	\$ -	\$ 450
Utility Unit Cost for MF accounts, \$/unit	\$ -	\$ -	\$ 400	\$ 400	\$ 400	\$ -
Utility Cost	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 1,500
Customer Unit Cost, \$/unit	\$500 SF, \$1,000 Condo	\$500 Condo, \$1,000 SF*	\$ 500	\$ 500	\$ 500	\$ 1,500
Annual Utility Admin & Marketing Cost, % of total annual cost	0%	10%	25%	25%	25%	25%
Affected Units	account	account	account	account	account	account
Comments		Assume \$1,000 per class for 30 students per class. Bay Friendly Landscape Program. Administrative costs include staff time to coordinate with teaching contractors.			Higher efficiency machines save an average of 51% more water than conventional top loading machines	

Conservation Measure Assumptions
Marin Municipal Water District

	Financial Incentives for Irrigation Upgrades - Intensive	Financial Incentives for Irrigation Upgrades - Program D	Financial Incentives for Irrigation Upgrades - Program E	Hotel Retrofit	Hotel Retrofit - Intensive	CII Rebates to Replace Inefficient Equipment
Measure Number	T2-6	T2-6	T2-6	T2-7	T2-7	T2-8
Applicable Customer Classes	SF, CONDO, MF, CII, IRR	SF, CONDO, MF, CII, IRR	SF, CONDO, MF, CII, IRR	Existing Customers: CII	COM Existing	COM Existing, INS
Included in Program Package (A, B, C or D)	C	D	E	B	C,D,E	B,C,D,E
Applicable End Uses	Irrigation	Irrigation	Irrigation	Indoor uses	Indoor uses	Process End Use
Water Use Reductions For Targeted End Uses	15%	15%	15%	100%	100%	35%
Evaluation Start Year	2008	2008	2008	2008	2008	2008
Evaluation End Year	2021	2021	2025	2022	2022	2022
Market Penetration Goal,%	SF 10%, Non-SF 25%	SF 20%, Non-SF 50%	SF 25%, Non-SF 65%	20%	60%	10%
Measure Life (years)	Permanent	Permanent	Permanent	Permanent	Permanent	Permanent
Utility Unit Cost for SF/CONDO accounts, \$/unit	\$ 450	\$ 450	\$ 350	\$ -	\$ -	\$ -
Utility Unit Cost for MF accounts, \$/unit	\$ -	\$ -	\$ 1,500	\$ -	\$ -	\$ -
Utility Cost	\$ 1,500	\$ 1,500	\$ 1,500	\$ 100	\$ 100	\$ 500
Customer Unit Cost, \$/unit	\$ 1,500	\$ 1,500	\$ 1,500	\$ 200	\$ 200	\$ 1,000
Annual Utility Admin & Marketing Cost, % of total annual cost	25%	25%	25%	25%	25%	25%
Affected Units	account	account	account	per room	per room	per account
Comments			Measure expanded to include gray water and rain catchment systems, low water use plants and food producing plants. Program length extended to the year 2025	Approximately 1802 rooms in MMWD service area	Approximately 1802 rooms in MMWD service area. Assume the \$100 average cost per room can replace various pieces of equipment. The cost is only an average to arrive at resonable budget per hotel. Small 2 bedroom hotel, budget would be \$200. Large 50 room hotel, budget would be \$5,000.	Added institutional category

Conservation Measure Assumptions
Marin Municipal Water District

	Existing Urinal Replacement	Existing Urinal Replacement - Intensive	Existing Urinal Replacement - Program E	Install AMS and Leak Detection Customer Notification	Require Rain Sensors	Require Smart Irrigation Controllers
Measure Number	T2-9	T2-9	T2-9	T2-10	ND1	ND2
Applicable Customer Classes	CII Existing	CII Existing	COM Existing	SF, CONDO, MF, COM, INS	New SF, New Condo, New MF, New CII	New SF, New Condo, New MF, New CII
Included in Program Package (A, B, C or D)	A,B	C,D	E	E	B,C,D,E	B,C,D,E
Applicable End Uses	COM Urinal	COM Urinal	COM Urinal	Internal and External Leakage	Irrigation	Irrigation
Water Use Reductions For Targeted End Uses	72%	72%	72%	25%	9%	15%
Evaluation Start Year	2008	2008	2008	2015	2010	2010
Evaluation End Year	2021	2024	2024	2030	2040	2040
Market Penetration Goal, %	10%	20%	20%	25%	100% of new	100% of new
Measure Life (years)	Permanent	Permanent	Permanent	Permanent	Permanent	Permanent
Utility Unit Cost for SF/CONDO accounts, \$/unit	\$ -	\$ -	\$ -	\$ 50	\$ 13	\$ 13
Utility Unit Cost for MF accounts, \$/unit	\$ -	\$ -	\$ -	\$ 200	\$ 13	\$ 13
Utility Cost	\$ 350	\$ 350	\$ 350	\$ 200	\$ 13	\$ 13
Customer Unit Cost, \$/unit	\$ 100	\$ 100	\$ 100	\$ 500	\$ 55	\$ 500
Annual Utility Admin & Marketing Cost, % of total annual cost	30%	30%	30%	10%	10%	10%
Affected Units	per account	per account	Assume 2 unrinals per CII Account. Assume unrinals make up 25% of the total CII toilet fixtures (Koeller & Company, July 2005).	account	account	account
Comments			Increased due to Plumbing code change. Marketing done by manufacturers who do installations. Customer cost assumes some drain line height change.	Cost is to call or e-mail customers if there is a leak. Will be as automated as possible by a computer program, use 1 full time staff person. Cost will be approximately \$100,000 per year.		

Conservation Measure Assumptions
Marin Municipal Water District

	Require High Efficiency Toilets	Require Efficient Dishwashers	Require Clothes Washers	Require Hot Water on Demand	Require High Efficiency Faucets & Showerheads	Require Landscape and Irrigation Requirements
Measure Number	ND3	ND4	ND5	ND6	ND7	ND8
Applicable Customer Classes	New SF, New Condo, New MF, New CII	New SF, New Condo, New MF, New CII	New SF, New Condo, New MF, New CII	New SF, New Condo, New MF, New CII	New SF, New Condo, New MF, New CII	New SF, New Condo, New MF, New CII
Included in Program Package (A, B, C or D)	B,C,D,E	B,C,D,E	B,C,D,E	B,C,D,E	B,C,D,E	B,C,D,E
Applicable End Uses	Toilet end use	Dishwasher end use	Clothes Washer end use	Faucet and shower end use	Faucet and shower end use	Irrigation
Water Use Reductions For Targeted End Uses	56%	34%	50%	14.2 gpd per house	15%	10% to 15%
Evaluation Start Year	2010	2010	2010	2010	2010	2010
Evaluation End Year	2011	2040	2040	2040	2040	2040
Market Penetration Goal,%	100% of new	100% of new	100% of new	100% of new	100% of new	100% of new
Measure Life (years)	Permanent	Permanent	Permanent	Permanent	Permanent	Permanent
Utility Unit Cost for SF/CONDO accounts, \$/unit	\$ 13	\$ 13	\$ 13	\$ 13	\$ 13	\$ 13
Utility Unit Cost for MF accounts, \$/unit	\$ 13	\$ 13	\$ 13	\$ 13	\$ 13	\$ 13
Utility Cost	\$ 13	\$ 13	\$ 13	\$ 13	\$ 13	\$ 13
Customer Unit Cost, \$/unit	\$ 300.00	\$ 400.00	\$ 500.00	\$ 700	\$ 50	\$ 3,000
Annual Utility Admin & Marketing Cost, % of total annual cost	10%	10%	10%	10%	10%	10%
Affected Units	account	account	account	account	account	account
Comments				Note - this measure is not currently in the MMWD Ordinance 414 or 421. This measure was included in the MWM 2007 and 2009 Conservation Studies.		

Marin Municipal Water District			
	Require Multi Family Submetering on New Accounts	Require Install New CII Equipment for Reduced Connection Fee	Require 0.5 Gal/flush Urinals in Bldgs.
Measure Number	ND9	ND10	ND11
Applicable Customer Classes	Apartments (5 or more units)	New CII	New CII
Included in Program Package (A, B, C or D)	B, C, D, E	B, C, D, E	B, C, D, E
Applicable End Uses	Indoor	Com Process	Com Urinal
Water Use Reductions For Targeted End Uses	15%	25%	72%
Evaluation Start Year	2010	2010	2010
Evaluation End Year	2040	2040	2014
Market Penetration Goal, %	100% of new	100% of new	100% of new
Measure Life (years)	Permanent	Permanent	Permanent
Utility Unit Cost for SF/CONDO accounts, \$/unit	0	0	0
Utility Unit Cost for MF accounts, \$/unit	0	0	0
Utility Cost	\$ 100.00	\$ 100.00	\$ 50.00
Customer Unit Cost, \$/unit	\$ 1,000.00	\$ 1,000.00	\$ 400.00
Annual Utility Admin & Marketing Cost, % of total annual cost	25%	25%	25%
Affected Units	account	account	account
Comments	\$100 inspection fee. Note this measure is not in the current MMWD Ordinance 414 and 421. This measure was included in the 2007 and 2009 MWM Conservation studies.	\$100 inspection fee. Note this measure is not in the current MMWD Ordinance 414 and 421. This measure was included in the 2007 and 2009 MWM Conservation studies.	\$50 inspection fee. Note this measure was originally designed for a replacement of 0.5 gallon per flush urinals or lower. The current MMWD Ordinance 421 requires 0.25 gallon per flush urinals.

Notes:

RSF = Residential Single Family

BUS/COM= Commercial

IRR = Dedicated irrigation meters

NRSF = New Single Family Homes

*Customer class varies depending upon local ordinances and Cal Green

RMF = Residential Multi Family

IND = Industrial

INS = Institutional/Public, buildings / grounds owned by the Water Utility or City

GOV = Government

APPENDIX E - COMPARISON OF INDIVIDUAL CONSERVATION MEASURES

Conservation Measures Evaluated

Appendix B presents the measure descriptions that were originally analyzed as part of the 2007 and 2009 study for “Tier 2” and “New Development” (ND). We have not modified the Tier 2 and New Development measure descriptions from their original description other than to add information for the new MMWD Board Ordinance 421 from December 2010 which supersedes the previous Ordinance 414 adopted January 1, 2010). The Tier 1 measures follow the definition of the CUWCC BMPs.

SB 407 (Plumbing Fixture Retrofit on Resale or Remodel): The new California Law SB 407 begins from the year 2017 in residential and 2019 in commercial properties. SB 407 was not directly included in this analysis as by the year 2017 all the older toilets and urinals had already been replaced by MMWD conservation measures, the MMWD Ordinance 421 or the plumbing code including the new building code Cal Green (described above).

Perspectives on Benefits and Costs

The determination of the economic feasibility of water conservation programs depends on comparing the costs of the programs to the benefits provided. The analysis was performed using the DSS Model. The DSS Model calculates savings at the end-use level; for example, the model determines the amount of water a toilet rebate program saves in daily toilet use for each single family account. For this evaluation, benefits are based the avoided costs of developing new sources of imported water for Marin Municipal Water District estimated to cost about \$1,631 per acre-foot.

Present value analysis using constant 2010 dollars and a real discount rate of 3% is used to discount costs and benefits to the base year. From this analysis, benefit-cost ratios of each measure are computed. When measures are put together in programs, the model is set up to avoid double counting savings from multiple measures that act on the same end use of water. For example, multiple measures in a program may target toilet replacements. The model includes assumptions to apportion water savings between multiple measures.

Economic analysis can be performed from several different perspectives, based on which party is affected. For planning water conservation programs for utilities, the perspectives most commonly used for benefit-cost analyses include the utility and the community. The “utility” benefit-cost analysis is based on the benefits and costs to the water provider. The “community” benefit-cost analysis includes the utility benefit and costs together with account owner/customer benefits and costs. These include customer energy and other capital or operating cost benefits plus costs of implementing the measure, beyond what the utility pays.

The utility perspective offers two advantages for this analysis. First, it considers only the program costs that will be directly borne by the utility. This enables the utility to fairly compare potential investments for saving and supplying water. Second, because revenue shifts are treated as transfer payments, the analysis is not complicated with uncertainties associated with long-term rate projections and retail rate design assumptions. Because it is the water provider’s role in developing a conservation plan that is paramount in this study, the utility perspective was primarily used to evaluate elements of the plan.

The community perspective is defined to include the utility and the customer costs and benefits. Costs incurred by customers striving to save water while participating in conservation programs are considered, as well as the benefits received in terms of reduced energy bills (from water heating costs) and

wastewater savings, among others. Other factors external to the utility, such as environmental effects and climate change, are not included in the benefit-cost analysis. Because these external factors are often difficult to quantify and are not necessarily under the control of the utility, they are therefore frequently excluded from economic analyses, including this one.

Present Value Parameters

The time value of money is explicitly considered. The value of all future costs and benefits is discounted to 2005 (the model start year) at the real interest rate of 3.0%. The DSS Model calculates this real interest rate, adjusting the current nominal interest rate (assumed to be approximately 6.1%) by the assumed rate of inflation (3.0%). Cash flows discounted in this manner are herein referred to as “Present Value” sums.

Assumptions about Measure Costs

Costs were determined for each of the measures based on industry knowledge, past experience and data provided by MMWD. Costs may include incentive costs, usually determined on a per-participant basis; fixed costs, such as marketing; variable costs, such as the costs to staff the measures and to obtain and maintain equipment; and a one-time set-up cost. The set-up cost is for measure design by staff or consultants, any required pilot testing, and preparation of materials that will be used in marketing the measure. Measure costs were estimated for 30 years, (each year between 2005 and 2035). Costs were spread over the time period depending on the length of the implementation period for the measure and estimated voluntary customer participation levels.

Lost revenue due to reduced water sales is not included as a cost because the conservation measures evaluated herein generally take effect over a span of time that is sufficient to enable timely rate adjustments, if necessary, to meet fixed cost obligations.

Assumptions about Measure Savings

Data necessary to forecast water savings of measures include specific data on water use, demographics, market penetration, and unit water savings. Savings normally develop at a measured and predetermined pace, reaching full maturity after full market penetration is achieved. This may occur three to ten years after the start of implementation, depending upon the implementation schedule.

Measure Assumptions including Unit Costs, Water Savings, and Market Penetrations

Appendix A includes assumptions in the DSS Model for each of the following variables for all measures modeled:

- *Targeted Water User Group; End Use* – Water user group (e.g., single-family residential) and end use (e.g., indoor or outdoor water use).
- *Utility Unit Cost (for MMWD)* – Cost of rebates, incentives, and contractors hired (by the utility) to implement measures.
- *Retail Customer Unit Cost* – Cost for implementing measures that is paid by retail customers (i.e., the remainder of a measure’s cost that is not covered by a utility rebate or incentive).
- *Utility Administration and Marketing Cost* – The cost to the utility administering the measure, including consultant contract administration, marketing, and participant tracking. The mark-up is sufficient (in total) to cover District conservation staff time and general expenses and overhead.

The unit costs vary according to the type of account and implementation method being addressed. For example, a measure might cost a different amount for a residential single family account, than a residential multi-family account, and for a rebate versus a direct installation implementation method. Typically water utilities have found that there are increased costs associated with achieving higher market saturation, such as more surveys per year. Appendix D shows the unit costs used in the study. The model calculates the annual costs based on the number of participants each year. The general formulas for calculating annual costs are:

Annual Utility Cost = Annual market saturation x total accounts in category x utility unit cost per account x (1+administration and marketing markup)

Annual Customer Cost = Annual number of participants x retail customer unit cost

Annual Community Cost = Annual utility cost + annual customer cost

Comparison of Individual Measures

Table E-1 presents how much water the measures would save over 30 years, how much they would cost, and what cost of water saved is if the measures were run on a stand-alone basis (i.e. without interaction or overlap from other measures that might address the same end use(s). Only the net or highest water savings for overlapping conservation measures was included in each program.

Economic indicators are defined below:

- *Utility costs:* those costs that the utility would spend include measure set-up, annual administration, and payment of rebates or purchase of devices or services as specified in the measure design.
- *Customer costs:* those costs customers would spend to participate in programs and maintaining its effectiveness over the life of the measure.
- *Community costs:* Community costs include utility and customer costs to implement measures.

The column headings in Table 12 are defined as follows:

- *Year 2035 Water Savings (AF/Yr)* = Water savings in 2035 (AF/Yr) where AF/Yr = acre-feet per year.
- *Present Value of Water Utility Costs* = 30 year present value of the time stream of annual costs.
- *Utility Benefit-Cost ratio* = NPV of utility costs/NPV of utility benefits over 30 years.
- *Community Benefit-Cost ratio* = (NPV of Utility Benefits plus NPV of customer energy savings)/NPV of utility plus NPV of customer costs).
- *Utility Cost of Savings per Unit Volume (\$/AF, by cost category)* = NPV of Category Costs divided by 30-year volume of water saved.
- *Total Utility Cost for Five Years 2011-2015* = Total cost in dollars to run the program for the years 2011 to 2015 (five years). This is a five year cost often useful for short term financial budgeting purposes.

Table E-1: Conservation Measure Cost and Savings

Marin Municipal Water District Conservation Measure Costs and Savings							
Measure Name	Present Value of Water Utility Benefits	Present Value of Water Utility Costs	Water Utility Benefit to Cost Ratio	Community Benefit to Cost Ratio	First Five Years Total Community Costs (2011-2015)	Cummulative Water Savings in Year 2035 (AF/Yr)	Cost of Savings per Unit Volume (\$/AF)
CUWCC #1a - Residential Water Surveys Interior	\$876,819	\$1,177,822	0.74	1.32	\$468,976	0	\$1,474
CUWCC #1a - Residential Water Surveys Interior - No AMS ProgE	\$436,897	\$573,123	0.76	1.36	\$385,497	0	\$1,669
CUWCC #1a - Residential Water Surveys Interior - AMS Program E	\$1,158,956	\$1,039,254	1.12	1.97	\$93,848	79	\$774
CUWCC #1b - Residential Water Surveys Exterior	\$1,134,287	\$1,177,822	0.96	0.93	\$454,321	0	\$1,127
CUWCC #1b - Residential Water Surveys Exterior - No AMS Prog E	\$532,829	\$554,237	0.96	0.93	\$363,405	0	\$1,319
CUWCC #1b - Residential Water Surveys Exterior - AMS Prog E	\$1,514,857	\$1,039,254	1.46	1.41	\$90,915	107	\$590
CUWCC #3 - Leak Detection and Repair 2% Reduction	\$16,373,422	\$3,306,279	4.95	4.95	\$860,000	625	\$203
CUWCC #3 - Leak Detection and Repair 3% Reduction	\$24,256,922	\$4,910,485	4.94	4.94	\$1,377,500	925	\$204
CUWCC #3 - Leak Detection and Repair 3.5% Reduction 3 crews	\$28,203,768	\$7,079,599	3.98	3.98	\$2,117,385	1133	\$249
CUWCC #5a - Large Landscape Water Budgets	\$6,854,982	\$389,818	17.59	17.59	\$32,026	236	\$59
CUWCC #5a - Large Landscape Water Budgets w/AMS	\$9,062,503	\$89,354	101.42	101.42	\$0	311	\$10
CUWCC #5b - Large Landscape Audits	\$163,901	\$131,344	1.25	0.25	\$26,196	3	\$896
CUWCC #6 - Washer Rebates	\$2,002,594	\$741,523	2.70	3.79	\$0	54	\$395
CUWCC #6 - Washer Rebates Prog D	\$2,354,525	\$939,348	2.51	3.52	\$0	65	\$423
CUWCC #6 - Washer Rebates Prog E	\$5,104,473	\$768,564	6.64	9.32	\$0	162	\$154
CUWCC #7 - Residential Public Education	\$4,900,078	\$3,107,027	1.58	2.38	\$793,586	151	\$673
CUWCC #9 - Commercial Water Audits	\$1,510,600	\$603,231	2.50	1.14	\$893,060	55	\$403
CUWCC #9 - Commercial Water Audits Prog D	\$2,150,745	\$847,873	2.54	1.15	\$1,587,475	82	\$393
CUWCC #9 - Commercial Water Audits w/AMS Prog E	\$3,126,561	\$2,237,592	1.40	0.61	\$317,845	343	\$591
CUWCC #14a - RSF Toilet Replacement	\$3,778,591	\$1,662,760	2.27	2.23	\$0	82	\$475
CUWCC #14b - RMF Toilet Replacement	\$1,694,070	\$244,815	6.92	6.81	\$0	34	\$160
Tier 2 - 1 Rain Sensor Retrofit	\$1,026,226	\$382,170	2.69	1.50	\$170,504	51	\$354
Tier 2 - 1 Rain Sensor Retrofit Intensive	\$2,056,988	\$754,516	2.73	1.52	\$426,440	103	\$341
Tier 2 - 1 Rain Sensor Retrofit Prog E	\$707,608	\$218,052	3.25	1.77	\$415,644	0	\$354
Tier 2 - 2 San Quentin Toilet Replacement	\$4,416,369	\$2,745	1608.61	19.07	\$0	153	\$1
Tier 2 - 3 High Efficiency Toilets	\$2,892,395	\$4,526,699	0.64	0.43	\$5,866,793	112	\$1,521
Tier 2 - 3 High Efficiency Toilets intensive	\$5,587,503	\$5,980,712	0.93	0.23	\$24,998,197	221	\$1,036
Tier 2 - 3a High Efficiency Toilets Prog E	\$2,390,453	\$3,250,111	0.74	0.36	\$6,608,109	98	\$1,302
Tier 2 - 3b High Efficiency Toilets Prog E	\$1,564,654	\$583,583	2.68	1.87	\$251,644	67	\$357
Tier 2 - 4 Homeowner Landscape Classes	\$472,341	\$83,994	5.62	0.35	\$677,194	20	\$173
Tier 2 - 4 Homeowner Landscape Classes Intensive	\$575,269	\$105,507	5.45	0.18	\$2,624,125	27	\$173
Tier 2 - 5 MF Washer Rebate Coin-Op Machines	\$242,884	\$107,581	2.26	3.53	\$224,299	9	\$435
Tier 2 - 5 MF Washer Rebate Coin-Op Machines Intensive	\$404,806	\$179,302	2.26	3.53	\$373,832	15	\$435
Tier 2 - 5 MF Washer Rebate Coin-Op Machines Intensive Prog E	\$759,292	\$233,223	3.26	5.09	\$373,832	29	\$297
Tier 2 - 6 Financial Incentives/Rebates for Irrigation Upgrades	\$1,260,693	\$2,372,837	0.53	0.21	\$3,222,928	66	\$1,736
Tier 2 - 6 Financial Incentives/Rebates for Irrigation Upgrades Intensive	\$3,046,622	\$4,144,054	0.74	0.29	\$5,908,752	161	\$1,252
Tier 2 - 6 Financial Incentives/Rebates for Irrigation Upgrades Prog D	\$6,030,697	\$8,217,806	0.73	0.29	\$11,817,504	319	\$1,253
Tier 2 - 6 Financial Incentives/Rebates for Irrigation Upgrades Prog D	\$7,105,390	\$9,435,960	0.75	0.28	\$11,394,258	427	\$1,195
Tier 2 - 7 Hotel Retrofit	\$2,866,961	\$60,884	47.09	31.31	\$75,797	151	\$20
Tier 2 - 7 Hotel Retrofit Intensive	\$4,146,149	\$88,654	46.77	31.09	\$113,695	221	\$20
Tier 2 - 8 CII Replace Inefficient Equipment	\$360,853	\$138,851	2.60	1.00	\$189,492	20	\$351
Tier 2 - 9 Existing Commercial Urinals	\$301,373	\$368,089	0.82	0.67	\$125,325	10	\$1,241
Tier 2 - 9 Existing Commercial Urinals Intensive	\$459,878	\$622,370	0.74	0.61	\$263,182	17	\$1,329
Tier 2 - 9 Existing Commercial Urinals Prog E	\$487,080	\$671,796	0.73	0.59	\$281,980	19	\$1,347
Tier 2 - 10 Install AMS Leak Detection Notification	\$1,269,148	\$946,397	1.34	0.13	\$992,238	49	\$653
Tier 2 - ND1 Rain Sensor Retrofit	\$719,426	\$40,890	17.59	3.52	\$88,524	54	\$51
Tier 2 - ND2 Smart Irrigation Controller	\$1,199,044	\$46,132	25.99	0.70	\$746,314	90	\$34
Tier 2 - ND3 High Efficiency Toilets	\$163,986	\$5,463	30.02	0.61	\$168,713	7	\$33
Tier 2 - ND4 Dishwasher New Efficient	\$173,121	\$45,594	3.80	0.68	\$601,046	13	\$234
Tier 2 - ND5 Clothes Washing Machine Requirement	\$1,277,062	\$45,943	27.80	2.33	\$743,262	93	\$32
Tier 2 - ND6 Hot Water on Demand	\$1,017,185	\$42,171	24.12	1.00	\$947,817	77	\$37
Tier 2 - ND7 High Efficiency Faucets and Showerheads	\$794,239	\$46,132	17.22	7.23	\$109,326	60	\$52
Tier 2 - ND8 Landscape and Irrigation Requirements	\$846,301	\$45,594	18.56	0.08	\$4,378,012	64	\$48
Tier 2 - ND9 MF Submetering	\$378,002	\$10,270	36.81	8.13	\$40,020	27	\$24
Tier 2 - ND10 New CII Reduced Connection Fees for Efficient Equipment	\$448,094	\$24,113	18.58	3.83	\$94,075	34	\$48
Tier 2 - ND11 New Commercial Urinals	\$45,056	\$7,965	5.66	0.76	\$59,629	1	\$176

Note: Some measures have a \$0 First Five Year Cost. That indicates there are no costs in that particular 5 year period. It does not mean there is no activity before 2011 or after 2011. This column is meant to be helpful for budgeting purposes only.

APPENDIX F- DETAILED RESULTS OF CONSERVATION PROGRAM EVALUATION

Selection of Measures for Programs

Appendix C provides a summary of which measures are included in each of the five alternative programs. The five programs are designed to illustrate a range of various measure combinations and resulting water savings.

These programs are not intended to be rigid programs but rather to demonstrate the range in savings that could be generated if selected measures were run together. In this step we account for a percent overlap in water savings (and benefits) and estimate combined savings and benefits from programs or packages of measures.

Results of Program Evaluation

Figure F-1 shows annual water demand with no conservation, plumbing code only, and the five programs. Table F-1 shows the savings in 5 year increments for all five programs. The savings in Table F-1 are just from the conservation programs alone and do not include the plumbing code savings. The separate starting points for the demand with and without the plumbing code versus the conservation programs is directly correlated to the fact that existing conservation programs are active from 2005 to 2009 and are already saving water by the year 2010.

Figure F-2 shows how marginal returns change as more money is spent to achieve savings. As the figure shows the cost versus savings curve is starting to decline after Program B. This means that the added cost of going from Program B to C will save less water per unit expenditure. In other words there are diminishing returns when the curve starts to flatten out as more aggressive measures are added to the program.

Table F-2 presents key evaluation statistics compiled from the DSS Model. Assuming all measures are successfully implemented, projected water savings for 2015 and 2035 in AF are shown, as are the costs of achieving this reduction. The costs are expressed two ways.

1. Total present value over the analysis period,
2. The cost of water saved. Cost of water saved is presented two ways: for the utility and the total community (customer plus utility).

These cost parameters are derived from the annual time stream of utility, customer and community costs.

Figure F-1: Long Term Demands with Conservation Programs

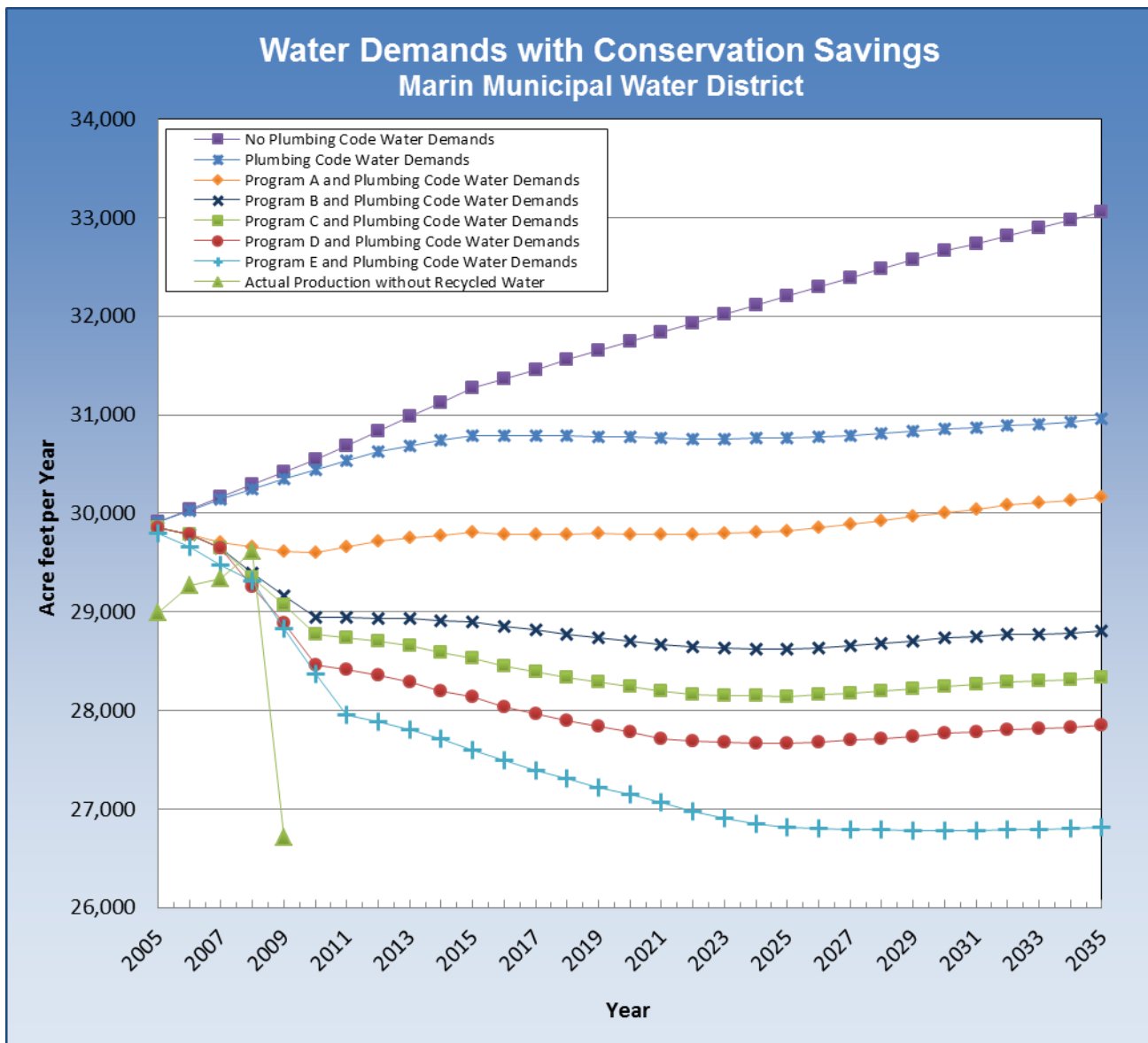


Table F-1: Long Term Conservation Program Savings

Water Demand Projections (AF/Yr) Marin Municipal Water District							
Conservation Program	2005	2010	2015	2020	2025	2030	2035
No Plumbing Code Water Demands	29,912	30,544	31,270	31,744	32,202	32,661	33,056
Plumbing Code Water Demands	29,912	30,439	30,791	30,772	30,766	30,855	30,955
Program A and Plumbing Code Water Demands	29,856	29,602	29,805	29,790	29,822	30,009	30,165
Program B and Plumbing Code Water Demands	29,856	28,941	28,896	28,704	28,624	28,733	28,803
Program C and Plumbing Code Water Demands	29,856	28,772	28,532	28,240	28,143	28,246	28,330
Program D and Plumbing Code Water Demands	29,856	28,462	28,134	27,778	27,667	27,766	27,847
Program E and Plumbing Code Water Demands	29,799	28,371	27,598	27,143	26,816	26,782	26,811
Actual Production without Recycled Water	28,990						

Figure F-2: Present Value of Utility Costs versus Cumulative Water Saved

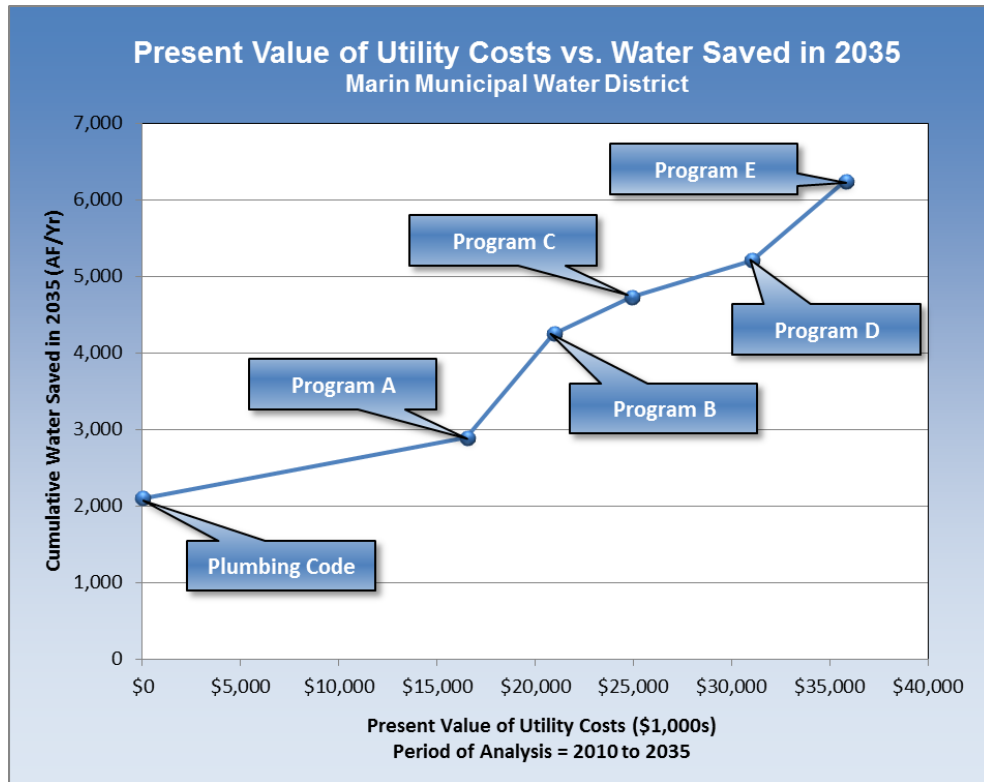


Table F-2: Comparison of Long-Term Conservation Programs – Utility Costs and Savings

Comparison of Conservation Program Costs and Savings Marin Municipal Water District										
Conservation Program	Water Utility Benefit-Cost Ratio	Community Benefit-Cost Ratio	2015 Water Savings (AFY)	2035 Water Savings (AFY)	2035 Indoor Water Savings (AFY)	2035 Outdoor Water Savings (AFY)	Total Water Savings as a % of Total Production in 2035	Present Value of Water Utility Costs (\$1,000)	Utility Total Cost for Five Years 2011-2015 (\$1,000)	Utility Cost of Water Saved (\$/AF)
Program A	1.63	1.40	985	790	409	381	2.6%	\$16,504	\$7,345	\$640
Program B	2.64	1.46	1,895	2,152	1,429	723	7.0%	\$20,947	\$8,944	\$380
Program C	2.65	1.12	2,258	2,625	1,757	869	8.5%	\$24,919	\$10,869	\$376
Program D	2.50	1.09	2,656	3,108	2,086	1,022	10.0%	\$31,040	\$14,336	\$398
Program E	2.67	1.30	3,192	4,144	2,700	1,444	13.4%	\$35,800	\$12,170	\$368

Notes:

- Present Value is determined using an interest rate of 3%
- Cost of water saved is present value of water utility cost divided by total 30-year water savings.
- Total Water Savings as a Percent of Total Production in 2035 is relative to no plumbing code production

APPENDIX G- MMWD SERVICE AREA POPULATION PROJECTION MEMORANDUM



MMWD MEMORANDUM

DATE: October 8, 2010
TO: Mike Ban
FROM: Jon LaHaye
SUBJECT: UWMP 2010 – MMWD Service Area Population Projection

The California Urban Water Management Planning Act requires urban water suppliers to provide projections of service area population in five-year increments to 20 years or as far as data is available. The projected population is a key element of water management planning and affects both estimates of future water needs, as well as, the potential savings from conservation measures. The projected population estimates are to be produced using federal, state and local agency reports and projections.

The Association of Bay Area Governments (ABAG) is the official comprehensive planning agency for the San Francisco Bay region. ABAG produces updated population forecasts (projections) every 2 years for each of the nine Bay Area Counties by city jurisdiction, subregional study area and census tract. The most recent ABAG projection was published in 2009. The 2009 projection includes population estimates in five-year increments from 2000 through 2035. The population forecasts can change appreciably from projection to projection. ABAG has been progressively lowering the population estimates in its last few projections. Figure 1 provides a comparison of 2005, 2007 and 2009 population projections for Marin County.

As part of the UWMP update the District obtained a copy of the ABAG Projections 2009 for Marin County. The District boundary was overlaid upon a map of the census tracts to determine which tracts are located within the District service area. The census tracts/service area map is attached as Figure 2. Fortunately the census tract and MMWD boundaries line up pretty well for the most part. In most cases, the populations of the census tracts were either 100% within or outside of the MMWD service area. The only exception being census tract 131000 which includes the coastal areas of Marin Headlands and Muir Beach. The Marin Headlands area is served by the District. However, Muir Beach is not within the District boundary. For census tract 131000, 50% percent of the population was assumed to be within the District. The attached Figure 3 provides a tabulation of the population projections by census tract, as well as, population estimates for the MMWD service area.

The ABAG 2009 projection for 2030 Marin County population is substantially lower (4.6%) than the population projected in 2005. This results in lower projected populations within the District service area. In previous UWMPs, the District has produced service area population estimates

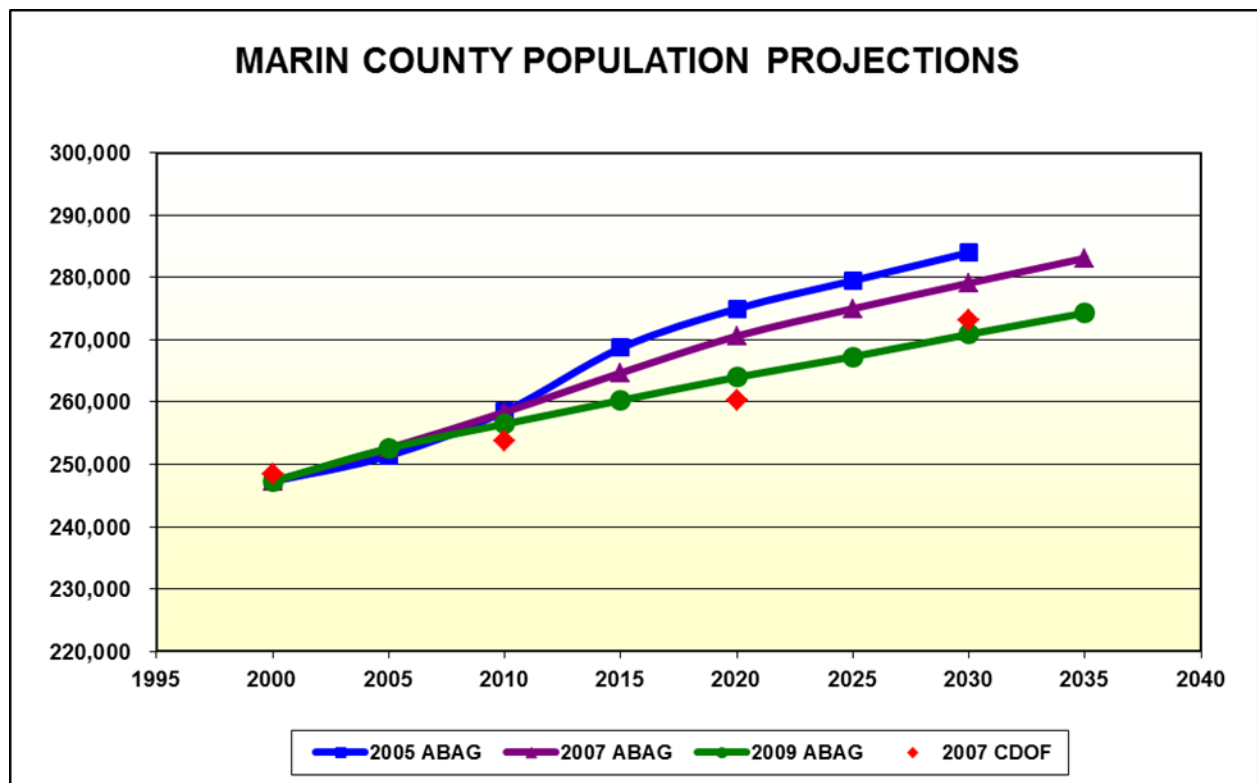
based on the subregional study area projections. Subregional study areas (SSA) are defined using LAFCO sphere of influence boundaries.

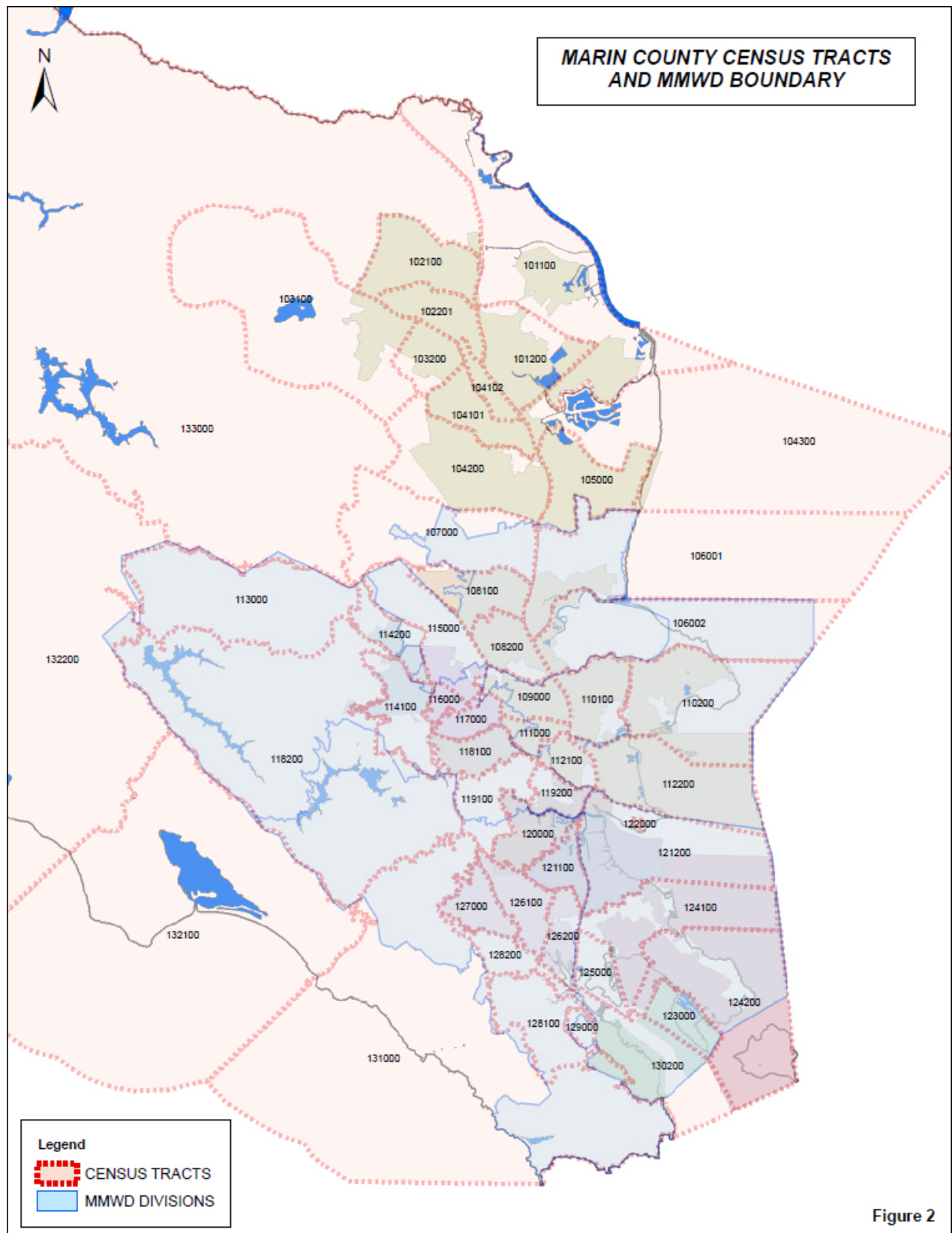
As a comparison, service area population estimates were produced using the SSA 2005, 2007 and 2009 ABAG projections. As in the countywide projections, the District service area estimates declined by about 5 percent between the 2005 and 2009 projections. In order to reconcile for the marked variations in the projections, it is recommended that an average of the three projections be adopted for use in the preparation of the 2010 UWMP. The attached Figure 4 provides comparisons of projected MMWD service area population based on the ABAG SSA projections and the population estimates included in the District's 2000 and 2005 UWMP.

UWMP 2010 Population Projection
Figure 1

COMPARISON OF POPULATION PROJECTIONS					
YEAR	MARIN COUNTY POPULATION				AVERAGE
	2005 ABAG	2007 ABAG	2009 ABAG	2007 CDOF	
2000	247,289	247,289	247,289	248,449	247,579
2005	251,400	252,600	252,600		252,200
2010	258,500	258,400	256,500	253,682	256,771
2015	268,700	264,700	260,300		264,567
2020	275,000	270,600	264,000	260,305	267,476
2025	279,500	275,000	267,300		273,933
2030	284,000	279,100	270,900	273,151	276,788
2035		283,100	274,300		278,700

ABAG - Association of Bay Area Governments
CDOF - California Dept. of Finance





UWMP 2010 Population Projection
Figure 3

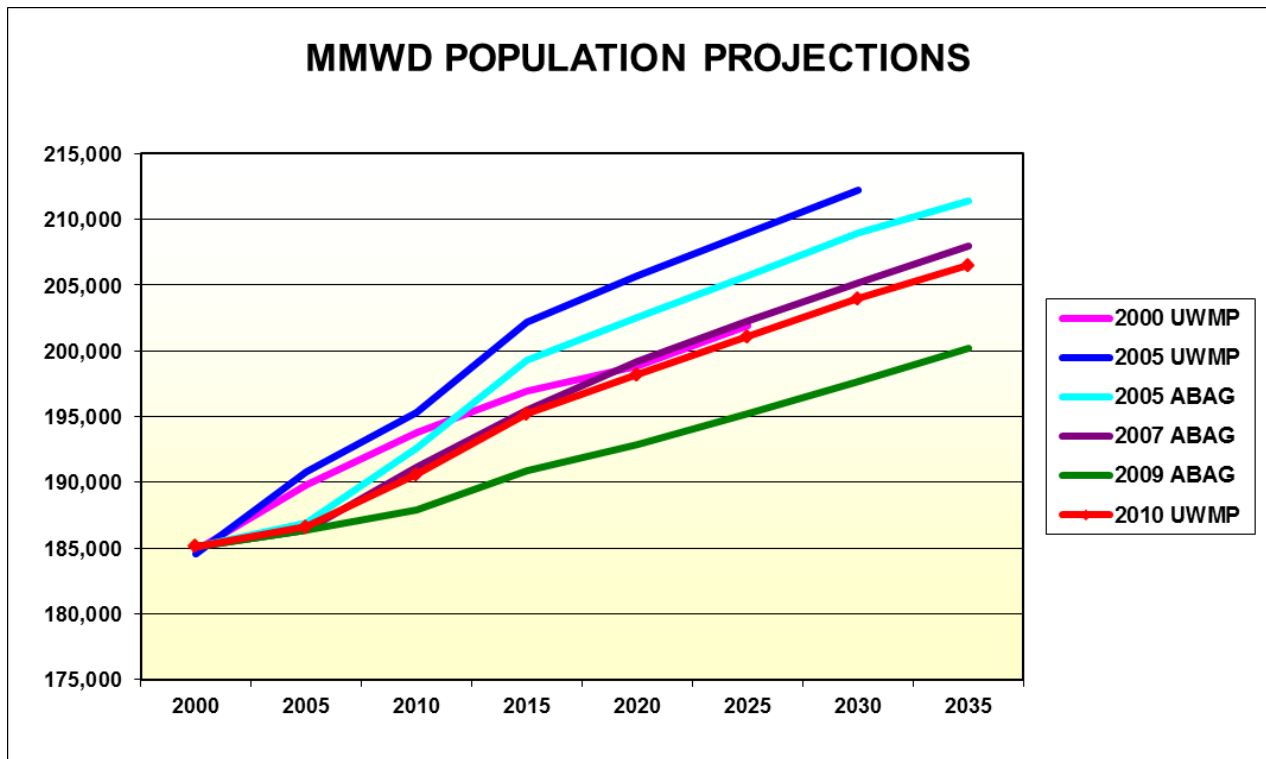
ABAG PROJECTIONS 2009 BY CENSUS TRACT - MARIN COUNTY

CENSUS TRACT	TRACT DESCRIPTION	MMWD	POPULATION							
			2000	2005	2010	2015	2020	2025	2030	2035
106001	Smith Ranch-St Vincents	Yes	3,826	3,857	3,877	3,906	3,930	3,947	3,963	3,980
106002	Santa Venetia	Yes	5,745	5,982	6,056	6,080	6,118	6,137	6,156	6,186
107000	Marinwood-Lucas Valley	Yes	6,400	5,257	5,368	5,385	5,388	5,398	5,410	5,445
108100	Terra Linda	Yes	6,524	6,646	6,732	6,746	6,762	6,775	6,785	6,822
108200	Terra Linda-Los Ranchitos	Yes	6,120	6,503	6,645	6,757	7,292	7,846	8,326	8,770
109000	San Rafael	Yes	7,778	7,842	7,876	8,118	8,293	8,418	8,538	8,668
110100	San Rafael-Dominican	Yes	5,643	5,810	5,876	6,093	6,272	6,397	6,535	6,663
110200	San Rafael-Glenwood-Peacock	Yes	5,432	5,746	5,770	5,796	5,809	5,816	5,824	5,839
111000	San Rafael-Central	Yes	5,528	5,907	6,022	6,032	6,285	6,626	6,921	7,261
112100	San Rafael-Bret Harte	Yes	4,018	4,320	4,366	4,508	4,731	4,869	5,020	5,131
112200	San Rafael-Canal	Yes	11,679	11,716	11,871	12,757	13,004	13,159	13,318	13,501
113000	San Geronimo Valley	Yes	3,797	3,878	3,905	3,917	3,919	3,934	3,936	3,949
114100	Fairfax	Yes	5,142	5,141	5,208	5,275	5,274	5,273	5,275	5,274
114200	Fairfax	Yes	3,092	3,091	3,121	3,139	3,140	3,140	3,139	3,139
115000	Sleepy Hollow	Yes	7,048	7,093	7,103	7,109	7,108	7,108	7,109	7,147
116000	San Anselmo	Yes	3,031	3,046	3,049	3,048	3,047	3,049	3,048	3,058
117000	San Anselmo	Yes	4,655	4,686	4,690	4,689	4,690	4,690	4,689	4,712
118100	Ross	Yes	2,329	2,359	2,360	2,359	2,360	2,360	2,359	2,361
118200	Fairfax-Kentfield-Watershed	Yes	319	326	335	346	345	347	346	347
119100	Kentfield	Yes	4,627	4,631	4,307	4,320	4,328	4,339	4,365	4,382
119200	Greenbrae	Yes	6,538	6,542	6,580	6,646	6,705	6,724	6,777	6,810
120000	Larkspur	Yes	6,040	6,049	6,115	6,130	6,147	6,156	6,169	6,189
121100	Corte Madera	Yes	4,958	5,089	5,092	5,147	5,148	5,168	5,206	5,258
121200	Corte Madera-East	Yes	5,521	5,606	5,715	6,154	6,258	6,406	6,693	7,083
122000	San Quentin Prison	Yes	6,362	6,363	6,381	6,408	6,425	6,434	6,441	6,444
123000	Belvedere	Yes	2,106	2,121	2,123	2,214	2,214	2,214	2,214	2,215
124100	Tiburon-West	Yes	5,377	5,422	5,464	5,484	5,489	5,496	5,504	5,508
124200	Tiburon-East	Yes	5,431	5,532	5,700	5,789	5,884	5,978	6,071	6,166
125000	Strawberry	Yes	3,931	4,007	4,042	4,103	4,130	4,168	4,223	4,247
126100	Mill Valley	Yes	5,527	5,619	5,624	5,632	5,738	5,795	5,900	5,972
126200	Mill Valley	Yes	4,335	4,404	4,409	4,429	4,431	4,432	4,440	4,450
127000	Mill Valley	Yes	4,428	4,488	4,492	4,530	4,596	4,628	4,696	4,808
128100	Tam Valley	Yes	6,188	6,216	6,247	6,268	6,295	6,302	6,317	6,334
128200	Homestead Valley	Yes	4,513	4,578	4,584	4,612	4,626	4,630	4,648	4,651
129000	Marin City	Yes	2,500	2,521	2,538	2,545	2,550	2,559	2,568	2,575
130200	Sausalito	Yes	7,758	7,842	7,946	8,046	8,145	8,244	8,339	8,436
131000	Headlands-Muir Beach	50%	324	327	331	333	333	335	338	341
101100	Novato-Black Point	No	2,539	2,743	2,811	2,875	2,896	2,942	2,971	2,999
101200	Novato	No	2,584	2,753	2,839	2,891	2,925	3,012	3,041	3,074
102100	Novato-San Marin	No	2,347	2,497	2,660	2,711	2,811	2,926	3,013	3,101
102201	Novato	No	9,981	10,411	10,841	11,032	11,295	11,492	11,663	11,873
103100	Novato-West	No	7,682	7,988	8,349	8,355	8,364	8,383	8,391	8,454
103200	Novato	No	6,590	7,010	7,185	7,191	7,270	7,295	7,307	7,339
104101	Novato	No	6,666	7,123	7,480	7,538	7,841	8,098	8,418	8,499
104102	Novato	No	4,959	5,377	5,477	5,499	5,507	5,534	5,541	5,560
104200	Novato-Ignacio	No	5,722	6,087	6,346	6,393	6,465	6,594	6,657	6,741
104300	Novato-Bel Marin Keys	No	1,665	1,833	1,926	2,027	2,134	2,311	2,533	2,590
105000	Novato-Hamilton	No	3,771	4,003	4,412	4,662	4,986	5,023	5,316	5,504
131000	Headlands-Muir Beach	50%	324	327	331	333	333	335	338	341
132100	Stinson Beach-Bolinas	No	2,337	2,336	2,347	2,365	2,373	2,391	2,402	2,406
132200	Inverness-Olema	No	2,332	2,332	2,338	2,339	2,346	2,359	2,370	2,373
133000	Pt Reyes Station-Tomales	No	3,220	3,222	3,233	3,236	3,248	3,305	3,326	3,331
Marin County Population			247,289	252,605	256,495	260,296	264,003	267,297	270,893	274,307
MMWD Service Area Population			184,570	186,563	187,920	190,850	193,209	195,297	197,606	200,122
Non-MMWD Population			62,719	66,042	68,575	69,447	70,794	72,000	73,287	74,185
MMWD Percentage			74.6%	73.9%	73.3%	73.3%	73.2%	73.1%	72.9%	73.0%

UWMP 2010 Population Projection
Figure 4

COMPARISON OF POPULATION PROJECTIONS						
Year	MMWD SERVICE AREA					
	2000 UWMP ¹	2005 UWMP ¹	2005 ABAG ²	2007 ABAG ²	2009 ABAG ²	2010 UWMP ³
2000	184,818	184,570	185,100	185,100	185,100	185,100
2005	189,843	190,800	186,900	186,400	186,400	186,600
2010	193,824	195,362	192,600	191,200	187,900	190,600
2015	196,940	202,155	199,300	195,500	190,900	195,200
2020	198,846	205,763	202,600	199,200	192,900	198,200
2025	201,900	208,971	205,700	202,300	195,200	201,100
2030		212,256	209,000	205,200	197,700	204,000
2035			211,400	208,000	200,200	206,500

Notes: 1) Published MMWD UWMP population values
 2) Population projections based on ABAG 2005, 2007 & 2009 SSA data
 3) Average of the ABAG based 2005, 2007, 2009 populations projections



APPENDIX F

Regional Alliance MOU, Board Resolution and DWR Letter

Letter Agreement
Between and Among
Cities of Santa Rosa, Rohnert Park, Sonoma, Cotati, Petaluma, Town of Windsor
And
North Marin Water District, Marin Municipal Water District
and Valley of the Moon Water District
For
Establishing a Regional Alliance to Comply with
SB x7-7 the Water Conservation Act of 2009

Recitals

A. The Water Conservation Act of 2009 (SB x7-7) set a goal of achieving a 20% reduction in statewide urban per capita water use by the year 2020 and requires urban water retailers to set a 2020 urban per capita water use target. SB x7-7 provides that urban water retailers may plan, comply and report on a regional basis, individual basis or both.

B. The Parties to this Letter Agreement (Cities of Santa Rosa, Rohnert Park, Sonoma, Cotati, Petaluma, Town of Windsor and North Marin, Marin Municipal and Valley of the Moon Water Districts) are eligible to form a "Regional Alliance" pursuant to the *Department of Water Resources Methodologies for Calculating Baseline and Compliance Urban Per Capita Water Use* (DWR Methodologies) because the Parties receive water from a common water wholesale water supplier, the Sonoma County Water Agency (Agency). The Parties desire to establish a Regional Alliance for purposes of complying with SB x7-7.

C. The Parties and the Agency are signatories to the Sonoma-Marin Saving Water Partnership Memorandum of Understanding (S-MSWP MOU) that provides for the identification and implementation of regional water conservation programs and tasks as directed by the Water Advisory Committee (WAC). The S-MSWP MOU requires financial and reporting commitments for implementation of water conservation programs.

Agreement for Regional Alliance Target Setting and Reporting

1. Regional Alliance Formation and Target Setting

Pursuant to the DWR Methodologies, the Parties hereby form a Regional Alliance and agree to send a letter to the Department of Water Resources (DWR) prior to July 1, 2011 informing DWR that a Regional Alliance has been formed. The Parties agree that the Regional Alliance Target will be established using Option 1 (as Option 1 is described in the DWR Methodologies) and that each Party will include the Regional Alliance Target in its individual 2010 Urban Water Management Plan.

2. Regional Alliance Review

No later than December 31, 2015, the Parties agree to review and re-analyze the Regional Alliance and Regional Alliance Target as part of the preparation of the 2015 Urban Water Management Plan.

3. Regional Alliance Reporting

The Parties agree to prepare Regional Alliance Reports pursuant to the DWR Methodologies including but not limited to the following information: baseline gross water use and service area population, individual 2015 and 2020 water use targets for each Party and for the Regional Alliance, compliance year gross water use and service area population, and adjustments to gross water use in compliance year. The information will be provided by each Party and reported in the annual S-MSWP report in addition to the information required in the annual report, as outlined in the S-MSWP MOU.

4. Regional Water Supply Planning

The Parties agree to participate in discussions regarding regional water supply planning.

5. Regional Alliance Dissolution

The Parties agree that each Party can withdraw from the Regional Alliance at any time without penalty by giving written notice to all other Parties. If a Party withdraws from the Regional Alliance, the Parties agree that the Regional Target will be recalculated among remaining participating Parties as set forth in the DWR Methodologies and in Section 2 above.

6. Miscellaneous

This Letter Agreement shall be between and among those Parties that have executed this Letter Agreement by May 1, 2011. If all Parties have not executed this Letter Agreement by said date, the Parties who have executed this Letter Agreement by May 1, 2011, agree that the Regional Target will be recalculated among participating Parties as set forth in the DWR Methodologies and in Section 2 above.

7. Letter Agreement Authorization

This Letter Agreement may be signed in counterparts. By signing below, each signatory states that he or she is authorized to sign this Letter Agreement on behalf of the Party for which he or she is signing.

Miles Ferris
Name: Miles Ferris
City of Santa Rosa

4/20/11
Date

Name: _____
City of Rohnert Park

Date

Name: _____
City of Sonoma

Date

Name: _____
City of Cotati

Date

6. Miscellaneous


This Letter Agreement shall be between and among those Parties that have executed this Letter Agreement by May 1, 2011. If all Parties have not executed this Letter Agreement by said date, the Parties who have executed this Letter Agreement by May 1, 2011, agree that the Regional Target will be recalculated among participating Parties as set forth in the DWR Methodologies and in Section 2 above.

7. Letter Agreement Authorization


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Name: _____
City of Santa Rosa

Date



Name: Gabriel A. Gonzalez
City of Rohnert Park



Date
Per Rohnert Park City Council
Resolution No. 2011-30 adopted on
April 12, 2011

Name: _____
City of Sonoma

Date

Name: _____
City of Cotati

Date

6. Miscellaneous

This Letter Agreement shall be between and among those Parties that have executed this Letter Agreement by May 1, 2011. If all Parties have not executed this Letter Agreement by said date, the Parties who have executed this Letter Agreement by May 1, 2011, agree that the Regional Target will be recalculated among participating Parties as set forth in the DWR Methodologies and in Section 2 above.

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_____	_____
Name: _____	Date
City of Santa Rosa	

_____	_____
Name: _____	Date
City of Rohnert Park	

	
Name: <u>Milenka Bates</u>	Date
City of Sonoma	

_____	_____
Name: _____	Date
City of Cotati	

6. Miscellaneous

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_____	_____
Name: _____	Date
City of Santa Rosa	

_____	_____
Name: _____	Date
City of Rohnert Park	

_____	_____
Name: _____	Date
City of Sonoma	

	_____
Name: <u>Dianne Thompson</u>	5-17-11
City of Cotati	Date


Name: PAMELA Tuft
City of Petaluma

4-11-11
Date

Name: _____
Town of Windsor

Date

Name: _____
North Marin Water District

Date

Name: _____
Marin Municipal Water District

Date

Name: _____
Valley of the Moon Water District

Date

Name: _____ Date _____
City of Petaluma



Name: J. Matthew Mullan Date 4-12-11
Town of Windsor

Name: _____ Date _____
North Marin Water District

Name: _____ Date _____
Marin Municipal Water District

Name: _____ Date _____
Valley of the Moon Water District

Name: _____

City of Petaluma

Date

Name: _____

Town of Windsor

Date

Chris DeGabriele
Name: Chris DeGabriele

North Marin Water District

4/26/2011
Date

Name: _____

Marin Municipal Water District

Date

Name: _____

Valley of the Moon Water District

Date

Name: _____

City of Petaluma

Date

Name: _____

Town of Windsor

Date

Name: _____

North Marin Water District

Date

Paul Helliker

Name: Paul Helliker

Marin Municipal Water District

5/13/11

Date

Name: _____

Valley of the Moon Water District

Date

Name: _____
City of Petaluma

Date

Name: _____
Town of Windsor

Date

Name: _____
North Marin Water District

Date

Name: _____
Marin Municipal Water District

Date

Krishna Kumar
Name: KRISHNA KUMAR
Valley of the Moon Water District

April 11, 2011
Date

RECEIVED

MARIN MUNICIPAL WATER DISTRICT

RESOLUTION NO. 8055

RESOLUTION AUTHORIZING THE GENERAL MANAGER TO SIGN THE LETTER AGREEMENT BETWEEN AND AMONG THE CITIES OF SANTA ROSA, ROHNERT PARK, SONOMA, COTATI, PETALUMA, TOWN OF WINDSOR, AND NORTH MARIN WATER DISTRICT, MARIN MUNICIPAL WATER DISTRICT AND VALLEY OF THE MOON WATER DISTRICT FOR ESTABLISHING A REGIONAL ALLIANCE TO COMPLY WITH SB X7-7, THE WATER CONSERVATION ACT OF 2009

WHEREAS, the State of California Urban Water Management Planning Act (UWMP Act) requires all urban water purveyors serving over 3,000 connections or over 3,000 acre-feet of water annually to prepare an Urban Water Management Plan every five years; and

WHEREAS, the Marin Municipal Water District is an urban supplier of water to approximately 60,000 service connections and supplying approximately 26,000 acre-feet of water annually and is therefore required to comply with the UWMP Act; and

WHEREAS, Senate Bill x 7-7, the Water Conservation Act (SBX7-7), was signed into law in 2009 and set a goal of achieving a 20% reduction in statewide urban per capita water use by the year 2020; and

WHEREAS, SBX7-7 provides that urban water retailers may plan, comply and report on a regional basis, individual basis or both; and

WHEREAS, the eight Water Contractors of the Sonoma County Water Agency, which include the cities of Petaluma, Rohnert Park, Santa Rosa, Cotati and Sonoma, and the North Marin Water District and the Valley of the Moon Water District, and the Marin Municipal Water District are eligible to form a regional alliance because the Water Contractors and MMWD are recipients of water from a common wholesale water supplier; and

WHEREAS, participating in a regional alliance provides the District with another option for complying with SBX7-7 and does not affect the District should the regional alliance be unable to meet the regional target; and

WHEREAS, District staff have evaluated participating in a regional alliance consisting of MMWD and the eight Water Contractors to comply with SBX7-7 and recommends participating in the regional alliance; and

NOW, THEREFORE, the Board of Directors of the Marin Municipal Water District authorize the General Manager to sign the letter agreement between and among the cities of Santa Rosa, Rohnert Park, Sonoma, Cotati, Petaluma, Town of Windsor, and North Marin Water District, Marin Municipal Water District and Valley of the Moon Water District for establishing a regional alliance to comply with SB X7-7, the Water Conservation Act of 2009 and furthermore authorize that the effective date of this approval be May 1, 2011.

PASSED AND ADOPTED this 4th day of May, 2011, by the following vote of the Board.

AYES:

NOES:

ABSENT:

President, Board of Directors

ATTEST:

Secretary



**NORTH MARIN
WATER DISTRICT**

999 Rush Creek Place
P.O. Box 146
Novato, CA 94948

PHONE
415.897.4133

FAX
415.892.8043

EMAIL
info@nmwd.com

WEB
www.nmwd.com

May 18, 2011

California Department of Water Resources
Division of Statewide Integrated Water Management
Water Use and Efficiency Branch
Attn: Manucher Alemi Chief
PO Box 942836
Sacramento, CA 94236

Dear Mr. Alemi

A regional alliance has been formed between and among the cities of Santa Rosa, Rohnert Park, Sonoma, Cotati, Petaluma, Town of Windsor and North Marin, Marin Municipal and Valley of the Moon Water Districts to comply with SBx7-7, the Water Conservation Act of 2009. The regional alliance has been formed pursuant to the Department of Water Resources Methodologies for Calculating Baseline and Compliance Urban Per Capita Water Use because the parties receive water from a common water wholesale supplier, the Sonoma County Water Agency. Data pertaining to the regional alliance can be collected through the individual cities and water districts urban water management plans to be submitted by July 1, 2011.

Should you have any questions regards the regional alliance, please contact me.

Sincerely,

Chris DeGabriele
General Manager
North Marin Water District

Chair, Technical Advisory Committee
to the Water Contractors receiving
wholesale supply from SCWA

cc: Miles Ferris, City of Santa Rosa
Darrin Jenkins, City of Rohnert Park
Milenka Bates, City of Sonoma
Damien O'Bid, City of Cotati
Pamela Tuft, City of Petaluma
Richard Burt, Town of Windsor
Krishna Kumar, Valley of the Moon Water District
Paul Helliker, Marin Municipal Water District

CD/rr

T:\GMS\SCWA\2011\dw letter re regional alliance.doc

APPENDIX G

Board Policy No. 2 - Recycled Water



MARIN MUNICIPAL WATER DISTRICT

BOARD POLICY

No.: 2

Date: 4/26/78

Revised 10/31/90

Revised 2/23/94

Revised 5/21/97

Subject: RECYCLED WATER

The Marin Municipal Water District wishes to encourage the maximum water reclamation of sanitary effluent for all beneficial uses. The development and operation of water reclamation facilities is consistent with the goals of the Marin Countywide Plan, and is determined to be compatible with the development of other water sources and the operation of a potable water system.

The following are offered to show the extent to which the District supports the development of water reclamation:

1. The Marin Municipal Water District recognizes water reclamation as an additional water source and an integral part of its water supply.
2. The District will from time to time determine the points, quantities, and rates of flow at which it will deliver recycled water for use by its customers. These determinations shall be made solely by the District on the basis of availability of dependable supply of recycled water, the feasibility of the distribution thereof to the point of delivery, and the water requirements of the customer.
3. In the discretion of the District, certain areas in and around a water reclamation facility may be designated as "recycled water use areas" which may require, as a condition of water service, the use of recycled water for irrigation, indoor water use, and other types of non-potable use.
4. The Water District shall pay all costs associated with the financing of reclamation treatment plants, transmission and distribution systems, excepting service installation charges and connection fees, which shall be determined and levied as follows:

Existing Consumers. Consumers within a "recycled water use area" who have installed an irrigation service prior to designation of said use area, or who have a possible recycled water use which can be separated from any potable use, may, at the discretion of the District, be required to connect to the recycled water system by assuring their onsite system is properly plumbed, but without charge or fee of any nature from the District.



MARIN MUNICIPAL WATER DISTRICT

BOARD POLICY

No.: 2

Page: 2

New Consumers. New consumers requesting service within a "recycled water use area" may be required, at the discretion of the District, to connect an irrigation service, separate indoor water use service, or other type of non-potable use service to the recycled water system. In such case, the District may charge said consumer the actual costs of service installation, together with the connection fee established for new uses.

5. In order to encourage the use of recycled water for appropriate and beneficial purposes, the rates to be charged for recycled water are less than the potable rates and are set forth in District Code Section 6.01.070.

APPENDIX H

Water Conservation and Dry Year Water Use Reduction Program

Title 13

WATER SERVICE CONDITIONS AND WATER CONSERVATION MEASURES

Chapters:

- 13.01 Eliminated (Ord. 346, 1993)
- 13.02 Water Conservation and Dry Year Water Use Reduction Program
- 13.03 Water Budgets and Related Conservation Measures

Chapter 13.02

WATER CONSERVATION AND DRY YEAR WATER USE REDUCTION PROGRAM*

Sections:

- 13.02.010 Declaration of purpose.
- 13.02.015 Declaration of Water Shortage Emergency.
- 13.02.020 Water waste prohibitions.
- 13.02.021 Water Conservation: Normal Year Water Conservation
- 13.02.030 Water use reduction in dry periods.
- 13.02.040 Calculation of allowable water use.
- 13.02.050 Variances.
- 13.02.060 Enforcement.
- 13.02.065 Unauthorized water use.
- 13.02.070 Further prohibitions.
- 13.02.080 Penalty for violations.
- 13.02.090 Appeals.
- 13.02.100 Remedies/cumulative.
- 13.02.110 Chapter controlling.

13.02.010 Declaration of purpose. The purpose of this chapter is to provide a water conservation plan to minimize the effect of a shortage of water on the district's consumers and to adopt provisions that will significantly reduce the consumption of water during an extended dry weather period (drought), thereby extending the available water for the district's consumers while reducing the hardship on the general public to the greatest extent possible, voluntary conservation efforts having proved insufficient to achieve these ends. The programs developed in this chapter are triggered based on lake storages developed by computer simulations performed utilizing the district's seven reservoirs with approximately eighty thousand acre-feet of total capacity and up to nine thousand acre-feet per year of imported water. (Ord. 387 §1, 1999; Ord. 316 §2 (part), 1991).

* Prior ordinance history: Ords. 279, 286, 290 and 314.

13.02.015 Declaration of Water Shortage Emergency. When the district's lake storage on December 1 is projected to be in the vicinity of, or less than, thirty thousand acre-feet, the board may declare by resolution a Water Shortage Emergency as defined in the Water Code and then advise the State Water Resources Control Board of the need to conserve local storage. (Ord. 387 §1, 1999)

13.02.020 Water waste prohibitions. No customer of the district shall make, cause, use or permit the use of potable water from the district for residential, commercial, industrial, agricultural, governmental or any other purpose in a manner contrary to any provision of this section.

(1) Prohibited Nonessential Uses Applicable to All Consumers. It is unlawful for any person, firm, partnership, association, corporation, or political entity to use water from the district for the following nonessential uses:

(A) The washing of sidewalks, walkways, driveways, parking lots and all other hard-surfaced areas by direct hosing, except as may be permitted by current regulations pertaining to urban water runoff pollution prevention as defined by the Marin County Stormwater Pollution Prevention Program and other controlling agencies;

(B) The escape of water through breaks or leaks within the consumer's plumbing or private distribution system for any substantial period of time within which such break or leak should reasonably have been discovered and corrected. It shall be presumed that a period of forty-eight hours after the consumer discovers such a leak or break, or receives notice from the district of such leak or break, whichever occurs first, is a reasonable time within which to correct such leak or break;

(C) Non-recycling decorative water fountains.

(D) Restrictions on Irrigation. Irrigation shall not be conducted in a manner or to an extent that allows water to run off or overspray the areas being watered. Every consumer is required to have his/her water distribution lines and facilities under control at all times to avoid water waste.

(E) Any excess water runoff flowing onto the public right of way at a rate of 1 gallon per minute or greater not caused by storm water or naturally occurring groundwater, is prohibited.

(2) Restrictions on Reverse-Osmosis Units. The installation of reverse-osmosis water purifying systems not equipped with an automatic shutoff unit is prohibited.

(3) The following are prohibited for new connections:

(A) Single-pass cooling systems for air conditioning or other cooling system applications unless required for health or safety reasons;

(B) Non-recirculating systems for conveyer carwash applications. (Ord. 421 §2, 2011; Ord. 387 §1, 1999; Ord. 332 §1, 1992; Ord. 316 §2 (part), 1991).

13.02.021 Water Conservation: Normal Year Water Conservation.

(1) Declaration of Purpose. The purpose of this chapter is to provide a water conservation plan to maximize the water supply during periods of relatively normal rainfall and to minimize the effect of a shortage of water on the district's consumers during an extended dry weather period (drought). The normal year conservation programs in this chapter are based on industry standards promulgated by the American Rainwater Catchment Systems Association (ARCSA), Bay-Friendly Landscape and Gardening Practices (Bay-Friendly), Best Management Practices developed by the California Urban Water Conservation Council (CUWCC), California Department of Water

Resources (DWR), California Invasive Plant Council (Cal-IPC), California Irrigation Management Information System (CIMIS), Consortium for Energy Efficiency (CEE), University of California Cooperative Extension (U.C. Extension), USEPA WaterSense Program (WaterSense), Water Use Classification of Landscape Species (WUCOLS), and other recognized conservation industry standards. In every case, the intent of this chapter is to remain a living document, incorporating the most restrictive industry standards in practice at the time in question. In the event that there is a conflict in regulations, the default shall be determined by the District, or as required by law.

Section 2 of Article X of the California Constitution specifies that the right to use water is limited to the amount reasonably required for the beneficial use to be served and the right does not and shall not extend to waste or unreasonable method of use. This policy protects local water supplies through the implementation of a whole systems approach to design, construction, installation and maintenance of the landscape resulting in water conserving climate-appropriate landscapes, improved water quality and the minimization of natural resource inputs.

(2) Definitions. Definitions used in this chapter are as follows:

- A.** Application for Service from an Existing Connection: The application for service from an existing connection, whether it is a new, increased, or modified water service, in a customer's name for a property.
- B.** Backflow Prevention Device: means an approved device installed to District standards which will prevent backflow or back-siphonage into the potable water system.
- C.** Booster Pumps: used where the normal water system pressure is low and needs to be increased.
- D.** Bubblers: Irrigation heads that produce a large volume of output, measured in gallons per minute (gpm) that flood the soil area surrounding the bubbler head.
- E.** Check Valve: a valve located under a sprinkler head or other location in the irrigation system, to hold water in the system to prevent drainage from sprinkler heads when the sprinkler is off.
- F.** Common Interest Development: community apartment projects, condominium projects, planned developments, and stock cooperatives per Civil Code Section 1351.
- G.** Compost: the decayed remains of organic matter that has rotted into a natural fertilizer suitable as a soil amendment to enhance plant growth.
- H.** Developed landscape area: All outdoor areas under irrigation, swimming pools, and water features, but excluding hardscape areas.

- I.** Ecological Restoration Project: a project where the site is intentionally altered to establish a defined, indigenous, historic ecosystem.
- J.** Effective Rainfall: the portion of total rainfall which becomes available for plant growth and that is used by the plants, defined as an average of 25% of total rainfall.
- K.** Emitter: a drip irrigation device that delivers water slowly from the system to the soil.
- L.** Estimated Total Water Use (ETWU): a calculated amount of water needed to irrigate a given landscape, and used as the basis for assigning water budgets at a site.
- M.** ET Adjustment Factor: a factor of 0.6, that, when applied to reference evapotranspiration as measured by a CIMIS weather station, or equivalent, adjusts for plant factors and irrigation efficiency, two major influences upon the amount of water that needs to be applied to the landscape.
- N.** Evapotranspiration rate: the quantity of water evaporated from adjacent soil and other surfaces and transpired by plants during a specific specified time.
- O.** Flow Rate: the rate at which water flows through pipes, and valves and emission devices, measured in (gallons per minute, gallons per hour, or cubic feet per second).
- P.** Hardscape: Impermeable areas including patios, decks and paths, driveways and sidewalks.
- Q.** Head-to-Head Coverage: a high-flow irrigation system designed to provide an irrigation spray pattern that delivers water from one sprinkler head to the next.
- R.** High-efficiency Fixture(s): High efficiency fixtures shall, at a minimum, meet the current requirements of the Water Sense labeling program and those of the California Department of Water Resources and the District.
 - 1. High-efficiency Irrigation Controller: An electronic device that controls the amount of time and frequency of operation for an irrigation system and adjusts automatically to compensate for the seasonal plant water requirements at the site (commonly referred to as weather-based irrigation controllers).
 - 2. High-efficiency Irrigation System: An irrigation system connected to a water service where the overall distribution uniformity (how evenly water is distributed across the irrigated landscape area) is a minimum of 71% and the volume of water used is consistent with seasonal plant requirements as defined by the District.

- S.** High volume irrigation: An irrigation device or system that delivers water to the landscape in a spray, stream-like, or flooding manner from above-ground irrigation nozzles with output expressed in gallons per minute (include many bubblers and micro-spray devices).
- T.** High-Flow Sensor: a device for sensing the rate of flow in the irrigation system.
- U.** High-water-use plants: Annuals, plants in containers, and plants identified as high-water-use in the current edition of the WUCOLS list published by the U.C. Extension. High-water-using plants are characterized by high transpiration rates, shallow rooting, the need for frequent watering during summer months or with exposure to hot and drying climatic conditions.
- V.** Hydrozones: A distinct grouping of plants with similar water needs and climatic requirements. Hydrozone types include, but are not limited to turf, high-water-use plants, low-water-use plants, microclimates (i.e., sun or shade, southern or northern exposures, surrounded by highly reflective surfaces), and partially hardscaped areas with plants, pool areas and water-use features.
- W.** Infiltration Rate: the rate of water entry into the soil expressed as a depth of water per unit of time (e.g., inches per hour).
- X.** Invasive Plant Species: species of plants not historically found in California and/or that spread outside cultivated areas and can damage environmental or economic resources as determined by Cal-IPC (www.cal-ipc.org) and the District.
- Y.** Irrigation Design Capacity: The maximum amount of water calculated to flow through an irrigation system, or section of a system, based on pipe size, pipe material, and operating pressure.
- Z.** Irrigation Efficiency (IE): a calculated measurement of the amount of water beneficially used divided by the amount of water applied. Irrigation efficiency is derived from measurements and estimates of irrigation system characteristics and management practices. The minimum average irrigation efficiency for purposes of this chapter is 0.71.
- AA.** Irrigation Meter: a separate water meter that measures the amount of water used exclusively for landscape uses, such as lawns, washing exterior surfaces, washing vehicles, filling pools, etc.
- BB.** Isolation Valves: used to isolate and shut-off water to a portion of the piping system.
- CC.** Landscape Agent: The consumer's designated representative for interacting with the District on landscape plan reviews.

- DD.** Landscape Plans: This includes a planting plan, an irrigation plan, and a grading plan drawn at the same scale and that clearly and accurately identify specified plants, irrigation layout, equipment, finish grades and drainage, specifications and construction details, plan sheet numbers, and drawing date of plans.
- EE.** Landscape Water Budget: The amount of water allowed for landscape water use at a site, adjusted on a seasonal basis, as determined by the District.
- FF.** Landscaped Area: the entire parcel, less the building footprint, driveways, and non-irrigated portions of parking lots and hardscapes. Water features, areas dedicated to edible plants, such as orchards or vegetable gardens are included in the calculation of the landscaped area. The landscape area does not include footprints of buildings or structures, sidewalks, driveways, parking lots, decks, patios, gravel or stone walks, other pervious or non-pervious hardscapes, and other nonirrigated areas designated for non-development (e.g., open spaces and existing native vegetation).
- GG.** Lateral Line: Non-pressurized pipe that is located downstream of an irrigation valve.
- HH.** Low Volume Irrigation: Irrigation devices, commonly called drip or point-source irrigation, with output measured and typically expressed in gallons per hour (gph), that apply water directly to soil in the plants root zone.
- II.** Low-Head Drainage: water that flows out of the system after the valve turns off due to elevation changes within the system.
- JJ.** Low-water-use plants: Plants identified as low-water-use in the current edition of the Water Use Classification of Species list published by the U.C. Extension. (generally, plants that once established, can survive on two irrigations per month during the summer months).
- KK.** Main Line: the pressurized pipeline that delivers water from the water source to the valve or outlet.
- LL.** Maximum Applied Water Allowance (MAWA): for design purposes, the upper limit of annual applied water for the established landscape as determined by the District.
- MM.** Microclimate: The climate of a specific area in the landscape that has substantially differing sun exposure, temperature, or wind, than adjacent areas or the area as a whole.
- NN.** Moderate Water Use Plants: ornamental trees, shrubs ground covers, and perennials and other plants recognized as moderate-water-use by WUCOLS.

- OO.** Mulch: any organic material such as leaves, bark, straw, compost or other inorganic mineral materials such as rocks, gravel, and decomposed granite left loose and applied to the soil surface for the beneficial purposes of reducing evaporation, suppressing weeds, moderating soil temperature and preventing soil erosion.
- PP.** Operating Pressure: the pressure when water is flowing through the irrigation system.
- QQ.** Overhead Irrigation: those systems that deliver water through the air (e.g., pop-ups, impulse sprinklers, spray heads, rotors, micro-sprays, etc).
- RR.** Overspray: Water delivered by an irrigation system outside the targeted landscape area during average operating conditions onto any adjacent hardscapes or other non-landscaped areas during an irrigation cycle, and specifically, for purposes of this Code, limited to maximum of 5% of spray radius area for each nozzle.
- SS.** Pervious: any surface or material that allows the passage of water through the material and into the underlying soil.
- TT.** Plant Factor: a factor specified in WUCOLS that, when multiplied by reference evapotranspiration (ET_o), estimates the amount of water used by specified plants.
- UU.** Point of Connection (POC): The location where an irrigation system is connected to water supply.
- VV.** Precipitation Rate: the rate of application of water measured in inches per hour.
- WW.** Pressure Regulating Valve: a valve that automatically reduces the pressure in a pipe.
- XX.** Project Applicant: the individual or entity submitting a Landscape Documentation Package, to request a permit, plan check or design review from the local agency. A project applicant may be the property owner or his or her designee.
- YY.** Property: Any structure, including but not limited to single family residential, multi-family residential and floating homes, built and/or intended primarily for sheltering or housing of any person and ancillary structures thereto.
- ZZ.** Property Owner: A person or entity that owns or has the financial authority or control over the property to comply with the requirements set forth in this chapter.

- AAA.** Rain Sensor: a system component which automatically shuts off and suspends the irrigation system when it rains.
- BBB.** Recreational Area: areas dedicated to active play or recreation such as sports fields, school yards, picnic grounds, or other areas with intense foot traffic parks, sports fields and golf courses where turf provides a playing surface.
- CCC.** Recycled Water: means tertiary treated water which results from the treatment of wastewater, is suitable for direct beneficial use, and conforms to the definition of disinfected tertiary recycled water in accordance with state law.
- DDD.** Reference Evapotranspiration or ETo: a standard measurement of environmental parameters which affect the water use of plants and are an estimate of the evapotranspiration of a large field of four to seven-inch tall, cool-season grass that is well watered.
- EEE.** Rehabilitated Landscape: any re-landscaping project that requires a building or grading permit, plan check or design review.
- FFF.** Residential Customer: The person(s) or entity with an existing water service connection for a residential property.
- GGG.** Runoff: Irrigation water that is not absorbed by the soil or landscape area to which it is applied and which flows onto other non-targeted areas, including runoff into storm drain systems.
- HHH.** Soils Laboratory Report: the analysis of a soil sample to determine nutrient content, composition and other characteristics, including contaminants, for horticultural purposes.
- III.** Special Landscape Area (SLA): an area of the landscape dedicated solely to edible plants, areas irrigated with recycled water, water features using recycled water and areas dedicated to active play such as parks, sports fields, golf courses, and where turf provides a playing surface.
- JJJ.** Sprinkler Head: a high volume irrigation device that delivers water to the landscape through a spray nozzle.
- KKK.** Static Water Pressure: the pipeline or municipal water supply pressure when water is not flowing.
- LLL.** Station: an area served by one valve or by a set of valves that operate simultaneously.

- MMM.** Submeter: a separate meter that is located on the private side of the water system and is plumbed to measure all water that flows only through the irrigation system. This meter is to be used by the owner to monitor irrigation water use and will not be read or maintained by the District.
 - NNN.** Swing Joint: an irrigation component that provides a flexible, leak-free connection between the emission device and lateral pipeline to allow movement in any direction and to prevent equipment damage.
 - OOO.** Turf: A mat layer of monocotyledonous plants with shallow rooting structures requiring frequent watering during the growing season; i.e., cool or warm season grass consisting, but not limited to Blue, Rye, Fescue, Bent, Bermuda, Kikuyu, St. Augustine, Zoysia, and Buffalo.
 - PPP.** Valve: a device used to control the flow of water in the irrigation system.
 - QQQ.** Valve Manifold: a one-piece manifold for use in a sprinkler valve assembly that includes an intake pipe having a water inlet and a plurality of ports adapted for fluid connection to inlets.
 - RRR.** Water Budget: an allocation of water based on plant water needs, used to determine the billing tiers for customers with dedicated landscape irrigation meters, for example.
 - SSS.** Water Feature: a design element where open water performs an aesthetic or recreational function. Water features include ponds, lakes, waterfalls, fountains, artificial streams, spas and swimming pools (where water is artificially supplied). The surface area of water features is included in the high water use hydrozone of the landscape area.
 - TTT.** Weather Based or Sensor Based Irrigation Control Technology: uses local weather and landscape conditions to tailor irrigation schedules to actual conditions on the site or uses historical weather data.
 - UUU.** WUCOLS: the Water Use Classification of Landscape Species published by the University of California Cooperative Extension, the Department of Water Resources and the Bureau of Reclamation, 2000.
- (Ord. 421 §3(part), 2011: Ord. 403 §4, 2004: Ord. 394 §1, 2001: Ord. 385 §1(part), 1999): Ord. 326 §1(part), 1991).

(3) Requirements for All Services.

- A.** Pressure Regulation. A pressure-regulating valve shall be installed and maintained by the consumer if static service pressure exceeds 80 pounds per square inch (psi), and be set at a maximum operating pressure of 60 psi at the regulator outlet. The pressure-regulating valve shall be located between the meter

and the first point of water use, or first point of division in the pipe, and pressure-relief valves and other plumbing safety devices shall be installed as required by local codes. The operating pressure requirement may be waived if the consumer presents evidence satisfactory to the District that high pressure is necessary in the design and that no water will be wasted as a result of higher pressure operation.

B. Interior Plumbing Fixtures. All plumbing installed, replaced or moved in any new or existing service shall be high-efficiency fixtures and shall meet the following minimum requirements:

1. **High-efficiency Clothes Washers:** Residential or commercial clothes washers that meet the current highest water efficiency standards as defined by the District. The General Manager shall have authority to grant a variance from the requirements of this section based upon financial hardship.
2. **High-efficiency Lavatory Faucet:** The maximum flow rate shall not exceed 1.5 gallons per minute (gpm) at a pressure of 60 pounds per square inch (psi) at the inlet, when water is flowing.
3. **High-efficiency Shower Head:** The manufacturer shall specify a maximum flow rate equal to or less than 2.0 gallons per minute (gpm), at a pressure of 60 pounds per square inch (psi) at the inlet, when water is flowing.
4. **High-efficiency Toilet:** Any WaterSense listed toilet rated at an effective flush volume of no greater than 1.28 gallons.
5. **High-efficiency Urinal:** The average water consumption shall not exceed 0.25 gallons per flush (gpf).

C. Pool Covers. Pool covers are required for all new outdoor swimming pools. (Ord. 421 §3(part), 2011; Ord. 385 §1(part), 1999); Ord. 326 §1(part), 1991).

(4) **Non-Residential Interior Plumbing Fixtures.** All plumbing installed, moved or replaced in any new or existing service shall be high-efficiency fixtures and shall meet the following minimum requirements: (Ord. 421 §3(part), 2011).

A. Faucets. Lavatory faucets, other than public lavatory or metering faucets, shall deliver 1.5 gallons, or less of water per minute.

1. **Metered Faucets** Self-closing or self-closing metering faucets shall be installed on lavatories intended to serve the transient public, such as those in, but not limited to, service stations, train stations, airports, restaurants, and convention halls. Metered faucets shall deliver no more than .25 gallons of water per use. Self-closing faucets shall deliver no more than .5 gallon per minute.

2. **Public Lavatory** (other than metering) faucets shall deliver 0.5 gallons, or less, of water per minute.
3. **Kitchen, Bar and Utility/Service** (other than hand-washing sinks) faucets shall deliver 2.2 gallons, or less, of water per minute.

B. Private Use, Public Use. *Pursuant to the International Plumbing Code (IPC):* “In the classification of plumbing fixtures, “private” applies to fixtures in residences and apartments, and to fixtures in nonpublic toilet rooms of hotels and motels and similar installations in buildings where the plumbing fixtures are intended for utilization by a family or an individual...” “public” applies to fixtures in general toilet rooms of schools, gymnasiums, hotels, airports, bus and railroad stations, public buildings, bars public comfort stations, office buildings, stadiums, stores, restaurants and other installations where a number of fixtures are installed so that their utilization is similarly unrestricted”.

C. Commercial Equipment Specifications.

1. **Dishwashers.** Dishwashers are machines designed to clean and sanitize plates, glasses, cups, bowls, utensils, and trays by applying sprays of detergent solution (with or without blasting media granules) and a sanitizing final rinse. Dishwashers shall meet the current specifications set by the Consortium for Energy Efficiency’s (CEE) “High Efficiency Specifications for Commercial Dishwashers and any and all amendments thereto”.
2. **Steamers.** A “steamer” or “steam cooker” is a device with one or more food steaming compartments in which the energy in the steam is transferred to the food by direct contact. Steamers shall meet the current specifications set by the CEE’s “High Efficiency Specifications for Commercial Steamers and any and all amendments thereto”.
3. **Pre-Rinse Spray Valves.** Pre-rinse valves use a spray of water to remove food waste from dishes prior to cleaning in a dishwasher. Pre-rinse spray valves shall (1) deliver 1.3 gallons, or less, of water per minute based on tested performance by the FSTC and (2) meets the cleaning performance standard of 26 seconds per plate or less, based on the ASTM *Standard Test Method for Performance of Pre-Rinse Spray Valves and any and all amendment thereto*.
4. **Dipper Wells.** A “dipper well” is a basin into which clean tap water flows constantly to provide a fresh supply of water for soaking utensils. The run-off goes down the drain. Dipper well flow rate shall be .3 gallon, or less, per minute.
5. **Ice Machines.** Ice machine are a factory-made assembly (not necessarily shipped in one package) consisting of a condensing unit and ice-making section operating as an integrated unit, with means for making and

harvesting ice. It is an assembly that makes up to 4,000 lbs of ice per day at Standard Ratings Conditions, as defined in Section 5.2.1 of ARI Standard 810-2006, and may also include means for storing or dispensing ice, or both. Ice machines shall (1) be Energy Star qualified and (2) meet the current highest Tier specification set by the CEE's "High Efficiency Specifications for Air-Cooled Ice Machines and any and all amendments thereto".

6. **Clothes Washers.** "Commercial clothes washer" means a soft mount front-loading or soft mount top loading clothes washer with clothes container compartment no greater than 3.5 ft³ for horizontal axis clothes washers, or nor greater than 4.0 ft³ for vertical axis clothes washers, that is designed for use in (1) applications where the occupants of more than one household will be using it, such as multi-family housing common areas and coin laundries, or (2) other commercial applications. Commercial clothes washers shall meet the minimum Modified Energy Factor (MEF) and maximum Water Factor (WF) corresponding to the highest efficiency machines on the most recent CEE "High Efficiency Specification for Commercial, Family-Sized Clothes Washers and any and all amendments thereto". As of January 1, 2007, the highest efficiency machines have a minimum MEF of 2.20 and a maximum WF of 4.5.
7. **Heating, Ventilation and Air Conditioning (HVAC) Equipment.** HVAC Equipment shall eliminate all once-through cooling, replacing with an air-cooled system or a cooling tower. For cooling towers, the following are recommended:
 - (a) flow submeters on make-up and bleed-off lines; submeters should, at a minimum, be capable of totaling the flow.
 - (b) conductivity controllers that activate the blowdown valve for dissolved solids control.
 - (c) overflow sensors on the overflow pipes.
 - (d) baffles or drift eliminators.

All cooling towers shall be monitored and maintained in a manner consistent with applicable regulatory guidelines and manufacturers recommendations.

(5) Water Efficient Landscaping

A. After January 1, 2011, this chapter shall apply to all of the following:

1. New construction and rehabilitated landscapes for public agency projects and private development projects with a landscape area equal to or greater than 1,000 square feet requiring a building or landscape permit, plan check or design review;
2. New construction and rehabilitated landscapes which are developer or contractor-installed in single-family and multi-family projects with a landscape area equal to or greater than 1,000 square feet requiring a building or landscape permit, plan check, or design review;
3. New construction and rehabilitated landscapes which are homeowner-provided in single family and multi-family residential projects with a total project landscape area equal to or greater than 2,500 square feet requiring a building or landscape permit, plan check or design review.

B. This chapter shall not apply to:

1. Registered local, state or federal historical sites;
2. Ecological restoration projects that do not require a permanent irrigation system;
3. Mined-land reclamation projects that do not require a permanent irrigation system; or
4. Plant collections, as part of botanical gardens and arboretums open to the public.

Note: Authority Cited: Section 65595, Government Code. Reference: Section 65596, Government Code.

C. Landscape Design Plan. For each landscape project subject to this chapter applicants shall submit a landscape design plan in accordance with the following:

1. Amendments, Mulching and Soil Conditioning: A minimum of 8" of non-mechanically compacted soil shall be available for water absorption and root growth in planted areas.
2. Incorporate compost or natural fertilizer into the soil to a minimum depth of 8" at a minimum rate of 6 cubic yards per 1000 square feet or per specific amendment recommendations from a soils laboratory report.

3. A minimum 3" layer of mulch shall be applied on all exposed soil surfaces of planting areas except in turf areas, creeping or rooting groundcovers or direct seeding applications.
4. Plants.
 - (a) Selected plants shall not cause the Estimated Total Water Use to exceed the Maximum Applied Water Allowance (see calculation in Appendix A).
 - (b) Plants with similar water use needs shall be grouped together in distinct hydrozones and where irrigation is required, the distinct hydrozones shall be irrigated with separate valves.
 - (c) Low and moderate water use plants can be mixed, but the entire hydrozone will be classified as moderate water use for MAWA calculations.
 - (d) High water use plants shall not be mixed with low or moderate water use plants.
 - (e) All non-turf plants shall be selected, spaced, and planted appropriately based upon their adaptability to the climatic, geologic, and topographical conditions of the project site.
 - (f) Turf shall not be allowed in the following conditions: Slopes exceeding 10%, planting areas 8 feet wide or less, street medians, traffic islands, planter strips adjacent to hardscape, or bulbouts of any size.
 - (g) Invasive plants as listed by the Cal-IPC are prohibited. Weedy species, listed as invasive in California at (www.cal-ipc.org/ip/inventory/index.php) shall not be planted. Please check the species you might be thinking of planting against these lists, broken out by plant type. Exemptions may be granted on a case by case basis if District staff determine that the proposed location, species, size, number of plants, and other cultural methods are not likely to cause harm to the watershed ecosystem.
 - (h) Fire Safe Landscape Practices. The requirements in this chapter are intended to support, and be in compliance with, all local and State requirements related to Fire Safe Landscaping practices, including, but not limited to, requirements for Wildlife Urban Interface zones as specified by the local authority.

- (i) Identify any applicable rain harvesting, graywater, or catchment technologies (e.g. rain gardens, cisterns, etc.). Applicants are encouraged to employ alternative irrigation techniques as appropriate, and where permitted by law.
- (j) Identify location and installation details of any applicable stormwater best management practices that encourage on-site retention and infiltration of stormwater. Appropriate stormwater best management practices are encouraged in the landscape design.

5. Water Features.

- (a) Re-circulating water systems shall be used for water features.
- (b) Recycled water shall be used when available and approved for use onsite.

D. Irrigation Design Plan.

1. For each landscape project subject to this chapter applicants shall submit an irrigation design plan that is designed, and installed, to meet irrigation efficiency criteria as described in Appendix A (MAWA) and in accordance with the following:
 - (a) Irrigation systems with meters 1 ½” or greater require a high-flow sensor that can detect high flow conditions and have the capabilities to shut off the irrigation system.
 - (b) Isolation valves shall be installed at the point of connection and before each valve or valve manifold.
 - (c) High-efficiency controllers, weather-based, or other sensor based self-adjusting irrigation controllers shall be required.
 - (d) Rain sensors shall be installed for each irrigation controller.
 - (e) Pressure regulation and/or booster pumps shall be installed so that all components of the irrigation system operate at the manufacturer’s recommended optimal pressure.
 - (f) Irrigation systems shall be designed to prevent runoff or overspray onto non-targeted areas, and wherever overhead irrigation is located directly adjacent to hardscape areas, where runoff water flows into the curb and gutter; all spray heads shall be setback a minimum of 24” from hardscape edges.

- (g) Low volume or bubbler irrigation is required where plant height at maturity will affect the uniformity of a high volume overhead spray system.
 - (h) Minimum 24" setback of overhead spray irrigation is required where turf is directly adjacent to a continuous hardscape area where runoff water flows into the curb and gutter.
 - (i) Slopes greater than 15% shall not be irrigated with an irrigation system with a precipitation rate exceeding 0.75 inches per hour (or lower if appropriate for site conditions as determined the District). This restriction may be modified if the irrigation designer specifies an alternative design or technology, as part of the Landscape Documentation Package, and clearly demonstrates no runoff or erosion will occur. Prevention of runoff and erosion must be confirmed during the irrigation audit.
 - (j) A single valve shall not irrigate hydrozones that mix high water use plants with moderate or low water use plants.
 - (k) Trees shall be placed on separate irrigation valves except when planted in turf areas.
 - (l) Sprinkler heads, rotors and other emission devices on a valve shall have matched precipitation rates.
 - (m) For all irrigation systems, coverage to sustain plant material in a healthy condition and provide irrigation efficiency shall be required. Head-to-head coverage is required for high volume spray systems unless otherwise directed by the manufacturer's specifications.
 - (n) Swing joints or other pipe protection components are required on above-ground irrigation piping.
 - (o) Check valves shall be installed to prevent low-head drainage.
- E. Separate District landscape water service meters shall be required for all new landscapes, other than single-family and two-unit residential landscapes, for which the irrigated area is equal to or greater than 1,000 square feet.
- 1. A private submeter shall be required for all rehabilitated landscapes, other than single-family and two-unit residential landscapes, for which the irrigated landscape area is equal to or greater than 1,000 square feet.
 - 2. A private submeter shall be required for all points of connection on single-family and two-unit residential sites for which the irrigated landscape area is equal to or greater than 2,500 square feet.

F. Documentation for Compliance. The following documentation is to be presented to the District at each of the three steps of review defined below. This documentation shall be required for compliance with this chapter. 13.02.021

1. STEP 1: DESIGN REVIEW. For those landscape projects that require Design Review, applicants shall submit the following documentation to the District:

- (a) Completed Appendix A, Maximum Applied Water Allowance (MAWA)
- (b) A landscape planting design plan that accurately and clearly identifies and depicts new and existing trees, shrubs, groundcovers, turf, and any other planting areas; plants by botanical name, common name, and plant factor; plant sizes and quantities; property lines, new and existing building footprints, streets, driveways, sidewalks and other hardscape features; pools, fountains, water features.
- (c) An irrigation design plan drawn at the same scale as the planting plan that:
 - (i) Accurately and clearly identifies and depicts irrigation system point(s) of connection;
 - (ii) Accurately and clearly identifies and depicts irrigation system components, e.g. controller, pipe, remote-control valves, sprinklers, rain shut-off device, check valves, pressure regulating devices, backflow prevention devices, and other required devices
 - (iii) Includes the Hydrozone Table (See Appendix B).
 - (iv) For the efficient use of water, grading of a project site shall be designed to minimize soil erosion, runoff, and water waste. A grading design plan drawn at the same scale as the planting design plan shall be submitted as part of the Landscape Documentation Package. Items 1(a-e) below are required for all projects.
 - (1) The project applicant shall submit a landscape grading plan that indicates finished configurations and elevations of the landscape area including:
 - (a) height of graded slopes:
 - (b) drainage patterns:
 - (c) pad elevations;
 - (d) finish grade: and
 - (e) stormwater retention improvements, if applicable.

- (2) It is highly recommended that, when site conditions allow, project applicants consider grading so that all irrigation and normal rainfall remains within property lines and does not drain on to non-permeable hardscapes.

The grading design plan shall contain the following statement: "I have complied with the criteria of this chapter and applied them accordingly for the efficient use of water in the grading design plan" and shall bear the signature of a licensed professional or contractor as authorized by law.

- (d) For homeowner-provided projects, a completed Homeowner's Irrigation Design Statement, Appendix B, which describes irrigation methods and design actions that will be employed to meet the irrigation specifications of this chapter, may be submitted in lieu of the irrigation design plan.
2. **STEP 2: COMPLETION OF INSTALLATION.** Upon installation and completion of the landscape, applicant shall submit Appendix D, the Certificate of Completion.

The certificate shall be accompanied by an irrigation audit that contains the following:

- (a) Operating pressure of the irrigation system.
- (b) Distribution uniformity of overhead irrigation.
- (c) Precipitation rate of overhead irrigation.
- (d) Report of any overspray or broken irrigation equipment.
- (e) Irrigation schedule including:
- (f) Plant establishment irrigation schedule.
 - (i) Regular irrigation schedule by month including: plant type, root depth, soil type, slope factor, shade factor, irrigation interval (days per week), irrigation runtimes, number of start times per irrigation day, gallons per minute for each valve, precipitation rate, distribution uniformity and monthly estimated water use calculations.
 - (ii) An irrigation maintenance schedule timeline shall be attached to the certificate of completion that includes: Routine inspections, adjustment and repairs to the irrigation system, aerating and dethatching turf areas, replenishing mulch, fertilizing, pruning and weeding.

3. STEP 3: FINAL INSPECTION. A final inspection shall be performed by District staff to verify compliance with this chapter. Once the completion form is received, the District will conduct an inspection to check for proper installation and operation of all landscape and irrigation elements per the approved plan; however, the District reserves the right to perform site inspections at any time before, during, or after irrigation system and landscape installation and to require corrective measures if requirements of this chapter are not satisfied. If corrective measures are necessary, the District will set the water budget to zero until corrective measures are completed.

Advanced notice is required for all inspections. Inspections can be requested for either morning or afternoon during regular business hours. Final approval shall not be completed until the landscape inspection is approved. An extension of the approval process, to complete landscape and irrigation installation, shall be requested and shall be approved District staff.

(Ord. 421 §3(part), 2011).

(6) Drinking Water Served Upon Request Only.

By January 1, 2011, eating or drinking establishments, including but not limited to a restaurant, hotel, café, cafeteria, bar, or other public place where food or drinks are sold, served, or offered for sale, are prohibited from providing drinking water to any person unless expressly requested.

(7) Commercial Lodging Establishments Must Provide Guests Option to Decline Daily Linen Services.

By January 1, 2011, hotels, motels and other commercial lodging establishments shall provide customers the option of not having towels and linen laundered daily. Commercial lodging establishments shall prominently display notice of this option in each bathroom using clear and easily understood language.

(8) Grey Water Systems. This section is reserved for future provisions regarding grey water systems.

(9) Rain Water Harvesting Systems. This section is reserved for future provisions regarding rain water harvesting systems.

- (10) Other Provisions. The General Manager will consider and may allow the substitution of design alternatives and innovation which may equally reduce water consumption for any of these requirements. The General Manager may accept documentation methods, water allowance determination, and landscape and irrigation design requirements of the State of California Model Water Efficient Landscape Ordinance instead of Chapters 14-30.040 and 14-30.050 of these requirements where it can be demonstrated that the State procedure will more effectively address the design requirements of the project.
- (11) Provisions For Appeal. The applicant or any affected person may appeal the final decision of staff regarding plan check or final inspection to the General Manager, The decision of the General Manager shall be final. An appeal regarding plan check shall be submitted prior to the installation of the landscape or it will be deemed to have been waived.
- (12) Penalties and Violations.
- A. Misdemeanor: Any violation of Section 13.02.021 may be prosecuted as a misdemeanor punishable by imprisonment in the county jail for not more than thirty (30) days, or by a fine not exceeding one thousand dollars (\$1,000), or by both.
 - B. Penalties: Penalties for failure to comply with any provisions of Section 13.02.021 are as follows:
 - 1. First Violation: The District will issue a written warning and deliver a copy of this ordinance by mail, hand, facsimile or email.
 - 2. Second Violation: A second violation within the preceding twelve (12) calendar months is punishable by a fine not to exceed one hundred dollars (\$100).
 - 3. Third Violation: A third violation within the preceding twelve (12) calendar months is punishable by a fine not to exceed two hundred and fifty dollars (\$250).
 - 4. Fourth and Subsequent Violations: A fourth and any subsequent violation is punishable by a fine not to exceed five hundred dollars (\$500).
 - 5. Water Flow Restrictor: In addition to any fines, the District may install a water flow restrictor device of approximately one gallon per minute capacity for services up to one and one-half inch size and comparatively sized restrictors for larger services after written notice of intent to install a flow restrictor for a minimum of forty-eight (48) hours.

- C. **Cost of Flow Restrictor and Disconnecting Service:** A person or entity that violates this ordinance is responsible for payment of the District's charges for installing and/or removing any flow restricting device pursuant to the District's schedule of charges then in effect. The charge for installing and/or removing any flow restricting device shall be paid to the District before the device is removed.
 - D. **Separate Offenses:** Each day that a violation of this ordinance occurs is a separate offense.
 - E. **Notice and Hearing:**
 - 1. The District will issue a Notice of Violation by mail or personal delivery at least ten [10] days before taking enforcement action. Such notice shall describe the violation and the date by which corrective action shall be taken. A customer may appeal the Notice of Violation by filing a written notice of appeal with the District's Water Conservation Manager no later than the close of business on the day before the date scheduled for enforcement action. Any Notice of Violation not timely appealed will be final. Upon receipt of a timely appeal, a hearing on the appeal will be scheduled, and the District will mail notice of the hearing date to the customer at least ten (10) days before the date of the hearing.
 - 2. Pending receipt of a written appeal or pending a hearing pursuant to an appeal, the District may take appropriate steps to prevent the unauthorized use of water as appropriate to the nature and extent of the violations and the current declared water level condition.
 - 3. This notice and hearing procedure shall not apply to those water waste situations charged as misdemeanors.
- (13) **Forms.** The following forms shall be submitted as described in this chapter: Appendix A, Maximum Applied Water Allowance; Appendix B, Homeowner's Irrigation Design Statement; Appendix C, Hydrozone Table; Appendix D, Certificate of Completion. (Ord. 421 §3(part), 2011; Ord. 414 §2, 2010)

Appendix A

Maximum Applied Water Allowance

The following calculations will help you determine your site specific water budget and establish a planting mix that will allow you to meet your water budget. Your Estimated Total Water Use must be less than your Maximum Applied Water Allowance.

1.) Maximum Applied Water Allowance (MAWA)

$$MAWA = (ET_o) (0.62)[(0.6 \times LA) + (0.4 \times SLA)]$$

Where:

ET_o = Annual Net Reference Evapotranspiration (inches)

0.6 = ET Adjustment Factor

LA = Landscaped Area (square feet)

0.62 = Conversion factor (to gallons per square foot)

SLA = Portion of the landscape area identified as Special Landscape Area (square feet)

0.4 = the additional ET adjustment factor for Special Landscape Area (1.0 - 0.6 = 0.4)

A.) Net Evapotranspiration Calculation

(Annual ET_o)

(Annual Rainfall)

x

.25

=

(Effective Rainfall)

Net Evapotranspiration Calculation

=

Annual ET_o

-

Effective Rainfall

=

B.) Adjusted Landscape Area Calculation

(Landscaped Area) x 0.6 Adjustment Factor

=

(Special Landscaped Area) x 0.4 Adjustment Factor

=

Sum of Adjusted Landscape Area

=

MAWA =

x

0.62

x

=

2.) Estimated Total Water Use (ETWU)

A.) Net Evapotranspiration Calculation

Net Evapotranspiration Calculation

=

Annual ET_o

-

Effective Rainfall

=

B.) Adjusted Landscape Area Calculation

/

(Low water use plant sqft) x 0.3

=

(Moderate water use plant sqft) x 0.6

=

(High water use plant sqft) x 1.0

=

Sum of Adjusted Landscape Area

=

ETWU =

x

0.62

x

=

Irrigation Efficiency Factor		
Percent of total landscape Irrigated with Drip		
0-25%		0.71
26-50%		0.75
51-75%		0.80
76-100%		0.85

Appendix B

Homeowner's Irrigation Design Statement

The intent of this statement is to provide the homeowner with an alternative method for conceptualizing the irrigation design. A signed, written statement shall be submitted to the District as part of the design review process, and shall include the following elements:

- ☐ Accurately and clearly describes the types and locations of all irrigation system point(s) of connection;
- ☐ Accurately and clearly describes the types and locations of all irrigation system components by valve zone, including high-efficiency irrigation controller, pipe, valves, high and low volume irrigation devices, rain shut-off device, check valves, pressure regulating devices, backflow prevention devices, and all other irrigation devices required by the District.
- ☐ **A completed hydrozone table, Appendix C.**
- ☐ **A description of plant species irrigated in each valve zone by scientific name, water use of each plant species as High, Moderate, or Low water use according to WUCOLS (Water Use Classification of Landscape Species) , and plant height at maturity for each plant. Plant height is not necessary where drip or bubbler will be used.**
- ☐ **A statement signed by the homeowner that includes the following certifying language: "The irrigation system will be installed as described in this statement, and in compliance with the requirements of the District".**

Appendix C Hydrozone Table

This worksheet is filled out by the project applicant and it is a required element of the Landscape Documentation Package. Please complete the hydrozone table(s) for each hydrozone. Use as many tables as necessary to provide the square footage of landscape area per hydrozone.

Hydrozone*	Zone or Valve	Irrigation Method**	Area (Sq. Ft.)	% of Landscape Area
Total				100%

Summary Hydrozone Table		
Hydrozone*	Area (Sq. Ft.)	% of Landscape Area
High Water Use		
Moderate Water Use		
Low Water Use		
	Total =	100%

***Hydrozone**

HW= High Water Use Plants
 MW=Moderate Water Use Plants
 LW=Low Water Use Plants

****Irrigation Method**

MS=Micro-spray
 S=Spray
 R=Rotor
 B=Bubbler
 D=Drip
 O=Other

Appendix D Certificate of Completion

This certificate is filled out by the project applicant, landscape architect and/or landscape contractor upon completion of the landscape project.

Part 1. Project Information Sheet

Date		
Project Name	Project Address	
Name of Project Applicant	Telephone No.	
	Fax No.	
Title	Email Address	
Company	Street Address	
City	State	Zip Code

Property Owner or his/her designee:

Name	Telephone No.	
	Fax No.	
Title	Email Address	
Company	Street Address	
City	State	Zip Code

"I/we certify that I/we have received copies of all the documents within the Landscape Documentation Package and that it is our responsibility to see that the project is maintained in accordance with the Landscape and Irrigation Maintenance Schedule."

Property Owner Signature

Date

Part 2. Landscape Architect and/or Landscape Contractor/Installer

Landscape Architect Name	Telephone No.	
	Fax No.	
Title	Email Address	
License No. or Certification No.	Telephone No.	
Company	Street Address	
City	State	Zip Code
Landscape Contractor/Installer Name	Telephone No.	
	Fax No.	
Title	Email Address	
License No. or Certification No.	Telephone No.	
Company	Street Address	
City	State	Zip Code

"I/we certify that the work has been completed in accordance with the ordinance and that the landscape planting and irrigation installation conform to the criteria and specifications of the approved Landscape Documentation Package. Additionally, the landscape audit and irrigation maintenance schedule have been completed as required and are attached to this certificate showing that the system meets the efficiency requirements used in the Estimated Total Water Use calculation"

Landscape Architect Signature

Date

Landscape Contractor Signature

Date

13.02.030 Water use reduction in dry periods. No customer of the district shall make, cause, use or permit the use of potable water from the district for residential, commercial, industrial, agricultural, governmental or any other purpose in a manner contrary to any provision of this section.

(1) Program to Reach a Ten Percent Water Use Reduction Goal (alert stage). When lake storage on April 1st in any year is below fifty thousand acre-feet and system modeling based on historic hydrologic data and use patterns indicates that a minimum reduction in use is required to assure a sufficient carry-over storage, the board may activate by resolution a voluntary use reduction program and should review its financial reserves to determine if a reduction in tier breaks is fiscally warranted to achieve ten percent savings in district's overall water use as follows:

(A) Consumer Percentage Curtailment. Every consumer shall eliminate water wastage in an effort to aid the district in achieving a ten percent reduction of the amount of potable water used by all consumers during the last year in which no restrictions in water use were required.

(B) Curtailment of Program. When lake storage on April 1st of any year is above fifty thousand acre-feet or when lake storage on or after January 1st is sufficiently above fifty thousand acre feet and projected demands will not reduce lake storage below fifty thousand acre-feet by the following April 1st, the requirements of this subsection shall be deactivated by resolution of the board.

(2) Twenty-five Percent Water Use Reduction Program. When lake storage on April 1st is below forty thousand acre-feet and system modeling based on historical hydrologic data and use patterns indicates a reduction in use is required to assure sufficient carry-over storage, the board may activate by resolution a mandatory use reduction program to achieve twenty-five percent savings in district's overall water use as follows:

(A) Consumer Use Reduction. Residential consumers, Billing Codes 1 through 5, shall use no more than the water use allocation assigned by the district based on an allotment per resident to aggregate a thirty-two percent reduction by all residential consumers. A resident is considered to be an individual who resides, or is expected to reside in the structure for a minimum of six months of the year.

Each nonresidential consumer, Billing Code 6 shall use no more than seventy-five percent, Billing Code 7 shall use no more than eighty percent, and Billing Code 8 shall use no more than fifty percent, of the annual water budget calculated by the district for said consumer pursuant to Chapter 13.03 of the district's code.

Every consumer shall eliminate water wastage and non-essential use of potable water from the district in an effort to aid the district in achieving a twenty-five percent reduction in the amount of water used by all consumers in the last year in which no restrictions in water use were required.

(B) Prohibited Nonessential Uses Applicable to All Consumers. It is unlawful for any person, firm, partnership, association, corporation or political entity to use potable water from the district contrary to the provisions of this subsection, or, if more restrictive, subsections (1), (2) and (3) of this section, or to use potable water for: refilling or as make-up water for decorative fountains or pools; irrigation between the hours of 11 AM and 7 PM; irrigation of new turf areas; washing of cars, boats, airplanes with hose without a shut-off nozzle; or serving water to restaurant patron except on request.

(C) Curtailment of Program. When lake storage on April 1st is above forty thousand acre-feet or when lake storage is sufficiently above forty thousand acre-feet and projected demands will not reduce lake storage below forty thousand acre-feet by the following April 1st,

the requirements of this subsection shall be deactivated by resolution of the board. (Ord. 387 §1, 1999; Ord. 376 §8, 1997; Ord. 325 §1, 1991; Ord. 323 §1, 1991; Ord. 316 §2 (part), 1991).

13.02.040 Calculation of allowable water use. When the requirements of Section 13.02.030 (2) are in effect, consumers in Billing Codes 6, 7 and 8 will reduce their use by the appropriate percentage of their water budget. (Ord. 387 §1, 1999; Ord. 376 §9, 1997; Ord. 316 §2 (part), 1991).

13.02.050 Variances. The general manager of the district may grant variances for use of water otherwise prohibited by this chapter if the general manager finds and determines that:

(1) The applicant, if requesting a variance for a nonresidential service (Billing Codes 6, 7 and 8), has agreed to abide by an annual water budget calculated pursuant to Chapter 13.03 of this title; and

(2) The applicant has agreed to adjust his water usage by complying with Section 11.04.080 of this code where determined to be applicable by district staff; and

(3) Failure to do so would cause an unnecessary and undue hardship on applicant or the public, including but not limited to, adverse economic impacts, such as loss of production or jobs; or

(4) Failure to do so would cause an emergency condition affecting the health, sanitation, fire protection or safety of the applicant or the public. (Ord. 387 §1, 1999; Ord. 316 §2 (part), 1991).

13.02.060 Enforcement.

(1) Any customer violating the regulations and restrictions on water use set forth in this chapter shall receive a written warning for the first such violation.

(2) Upon a second violation, the following enforcement process shall be implemented by the District:

(A) The customer shall receive a written warning describing the nature of the second violation and the required corrective action(s).

(B) Upon receipt of the written warning for the second violation, the customer shall have a 15 calendar day period in which to implement the corrective action(s) and shall notify the District when the corrective actions have been completed.

(C) District staff will conduct a site visit to verify that the corrective action(s) are complete and satisfy the requirements in this chapter.

(3) If the customer fails to complete the required corrective action(s), and notify the District within the 15 calendar day period, the District shall issue a Notice of Violation by certified mail or personal delivery at least 10 calendar days before imposing a \$250 fine on the customer's water bill. The notice shall inform the customer that he/she may appeal the imposition of the fine to the District's General Manager by filing a written appeal within 7 calendar days of the date of the letter. Any Notice of Violation not timely appealed will be final. Upon receipt of a timely appeal, a hearing on the appeal will be scheduled and the District will mail notice of this date to the customer at least 10 calendar days before the hearing. The General Manager's decision is final. Pending receipt of a written appeal or pending hearing pursuant to an appeal, the District may take appropriate steps to prevent unauthorized use of water as appropriate to prevent waste. This notice and hearing procedure shall not apply to those water waste situations charged as misdemeanors.

(4) Failure by the customer to pay the fine and correct the violation, may cause the District to install a flow restrictor to be installed in the service. If a flow restrictor is placed, the cost of installation and removal specified in Section 11.32.020 of this code shall be paid by the violator.

(5) Any willful violation occurring subsequent to the issuance of the second written warning may constitute a misdemeanor and may be referred to the Marin County district attorney's office for prosecution pursuant to Section 13.02.080.

(6) The district may also disconnect the water service in accordance with Section 11.28.030 of this code. If water service is disconnected, it shall be restored only upon payment of the turn-on charge fixed by the board of directors under the provisions of Section 11.08.130(2) of this code. (Ord. 421 §4, 2011; Ord. 387 §1, 1999; Ord. 316 §2 (part), 1991).

13.02.065 Unauthorized water use. Use of water without having made application to the district for water service or use of any district water not metered pursuant to such application is prohibited pursuant to this chapter, and in addition to the penalties contained in Section 13.02.080, violators will be subject to the charges for use of such water set forth in Section 6.01.080 of this code. (Ord. 316 §2 (part), 1991).

13.02.070 Further Prohibitions. It is unlawful for any person, firm, partnership, association, corporation or political entity to remove, replace, alter or damage any water meter or components thereof, including but not limited to the meter face, its dials or other water usage indicators and any flow restricting device installed pursuant to Section 13.02.060. (Ord. 316 §2 (part), 1991).

13.02.080 Penalty for violations. Except as provided in Section 13.02.060, for the first and second violations any person, firm, partnership, association, corporation or political entity violating or causing or permitting the violation of any of the provisions of this chapter or providing false information to the district in response to district's requests for information needed by the district to calculate consumer water allotments shall be guilty of a misdemeanor punishable by imprisonment in the county jail for not more than thirty days or by a fine not exceeding one thousand dollars or both. Each separate day or portion thereof in which any violation occurs or continues without a good faith effort by the responsible party to correct the violation shall constitute a separate offense and, upon conviction thereof, shall be separately punishable. (Ord. 316 §2 (part), 1991).

13.02.090 Appeals. Variances from the requirements of this chapter may be granted by the board of directors only after denial of a variance request by the general manager. Appeals of variance request denials shall be made in writing to the secretary of the board at least two weeks prior to the meeting at which they will be heard. Upon granting any appeal, the board of directors may impose any conditions it determines to be just and proper. Variances granted by the board of directors shall be prepared in writing, the original to be kept on file with the district and a copy to be furnished to the applicant. The board of directors may require it to be recorded at applicant's expense. (Ord. 316 §2 (part), 1991).

13.02.100 Remedies/cumulative. The remedies available to the district to enforce this chapter are in addition to any other remedies available under the district's code, or any state statutes or regulations, and do not replace or supplant any other remedy, but are cumulative. (Ord. 316 §2 (part), 1991).

13.02.110 Chapter controlling. The provisions of this chapter shall prevail and control in the event of any inconsistency between this chapter and any other rule, regulation, ordinance or code of this district. (Ord. 316 §2 (part), 1991).

Chapter 13.03

WATER BUDGETS AND RELATED CONSERVATION MEASURES*

Sections:

13.03.010	Declaration of purpose.
13.03.020	Basis for determination of water budget.
13.03.030	Water budgets, when required.
13.03.031	Increasing a Service's Water Budget.
13.03.040	Efficient plumbing fixtures.
13.03.050	Variances from Section 13.13.040.
13.03.060	Appeals.
13.03.070	Penalty for violations.
13.03.080	Recordation of notice.
13.03.090	Cost of enforcement.
13.03.100	Chapter controlling.
13.03.110	Remedies/cumulative.
13 03 120	Flow restrictors.

13.03.010 Declaration of purpose. The purpose of this chapter is to specify the terms and conditions under which water budgets will be required and to specify when consumers will be required to retrofit water using fixtures with low-flow or ultra-low-flow fixtures, all for the purpose of permanently reducing the per capita consumption of water by the district's customers, thereby reducing the hardship on the district's consumers resulting from over-subscription of the district's water supplies which has increased the susceptibility of the district's supply to shortfalls in dry years. (Ord. 316 §2 (part), 1991).

13.03.020 Basis for determination of water budget. The initial annual water budget for each existing service which is not a single-family residential or multi-unit residential structure is determined by the district assigning the amount of the water entitlement based on the purchased water entitlement, calculated consumption or designated annual consumption as defined in Section 11.08.180 of this code. The water budget for each service may be adjusted below the water entitlement as set forth in Section 11.08.035. All customers except residential customers exceeding their annual water entitlements are subject to terms and conditions of Section 11.08.030 of this code regarding changing character and/or increasing use of water. (Ord. 376 §9, 1997; Ord. 340 §1 (part), 1992; Ord. 316 §2 (part), 1991).

13.03.030 Water budgets when required. Services must conform to the annual water budget calculated by the district for each property receiving water service as follows:

- (1) New services: immediately upon connection.

* Prior ordinance history: Ords. 295, 301, 309, 310 and 314.

(2) Existing services: as a condition of receipt of a variance or as part of the calculation of allowable use pursuant to Section 13.02.040 of this title, or upon receipt of notification from district that an annual water budget has been prepared by district staff. (Ord. 316 §2 (part), 1991).

13.03.031 Increasing a Service's Water Budget. Requests to increase a service's Water Budget, as a result of an entitlement purchase or transfer, or where the service's water budget is less than the service's water entitlement shall meet the following requirements:

(1) Mixed-use Non-Residential Services:

(A) Interior Fixtures. Interior Fixtures shall meet conditions as stated in District Code Section 13.02.02.

(B) Irrigated Landscape Areas. A minimum 3" layer of mulch shall be applied on all exposed soil surfaces of planting areas except in turf areas or creeping or rooting groundcovers. Rain sensors shall be installed for each irrigation controller. Irrigation system shall be adjusted to minimize runoff or overspray onto non-targeted areas.

(2) Dedicated Irrigation Services. The following items shall be completed by the applicant according to the requirements in District Code Section 13.02.02:

- A landscape water budget calculating both MAWA & ETWU requirements.
- A landscape hydrozone table.
- A minimum 3" layer of mulch shall be applied on all exposed soil surfaces of planting areas except in turf areas or creeping or rooting groundcovers.
- Rain sensors shall be installed for each irrigation controller.
- Irrigation system shall be adjusted to minimize runoff or overspray onto non-targeted areas.
- Backflow prevention equipment shall be installed and tested as required by the District.

Upon determining the service meets the requirements for both indoor and outdoor water use, and based on the current water efficiency standards established by the District, the service may be eligible to increase the annual water budget as calculated by staff, but in no case shall the budget exceed the services entitlement. Requests to increase a service's water budget may be made once per calendar year. (Ord. 421 §5, 2011).

13.03.040 Efficient plumbing fixtures. Any plumbing fixture in any existing service which is replaced, added or moved shall conform to the criteria contained in District Code Section 13.02.021. (Ord. 414 §3, 2010; Ord. 316 §2 (part), 1991).

13.03.050 Variances from Section 13.13.040. The general manager may, in his discretion, exempt services from the requirements of Section 13.03.040 of this chapter, or impose reasonable conditions in lieu of compliance therewith, if he determines that any of the following conditions apply:

(1) Hardship. The general manager may grant an extension for hardship where the requirements of Section 13.03.040 cause an unnecessary and undue substantial hardship upon the owner, or purchaser of the facility or the public. Substantial hardship may include, but is not limited to:

(A) Plumbing in an existing facility which does not match the connections with efficient plumbing fixtures and would, therefore, require partial replumbing of the structures;

(B) Unavailability of efficient plumbing fixtures to match a well-defined historic architectural style in a locally, state or federally recognized building of historic significance, fitted with authentic plumbing fixtures;

(C) Any project exempted pursuant to subsection (1) of this section shall be required to have installed toilets using a maximum of 3.5 gallons per flush and three gallons per minute showerheads if not already so provided.

(2) Emergency. The general manager may grant an exemption for emergency purposes when the requirements of Section 13.03.040 would create a condition affecting the health, sanitation, fire protection or safety of the facility owner or the public.(Ord. 316 §2 (part), 1991)

13.03.060 Appeals. Except for variances from Section 13.03.040, variances from the requirements of this chapter may be granted by the board of directors only after denial of a variance request by the general manager. Appeals of variance request denials shall be made in writing to the secretary of the board at least two weeks prior to the meeting at which they will be heard. Upon granting any appeal, the board of directors may impose any conditions it determines to be just and proper. Variances granted by the board of directors shall be prepared in writing, the original to be kept on file with the district and a copy to be furnished to the applicant. The board of directors may require it to be recorded at applicant's expense. (Ord. 316 §2 (part), 1991).

13.03.070 Penalty for violations. Any person, firm, partnership, association, corporation or political entity violating or causing or permitting the violation of any of the provisions of this chapter shall be guilty of a misdemeanor punishable by imprisonment in the county jail for not more than thirty days or by a fine not exceeding one thousand dollars or both. Each separate day or portion thereof in which any violation occurs or continues without a good faith effort by the responsible party to correct the violation shall constitute a separate offense and, upon conviction thereof, shall be separately punishable. (Ord. 316 §2 (part), 1991).

13.03.080 Recordation of notice. Whenever the general manager determines that low water-use plumbing fixtures required by Section 13.03.040 have not been installed or have been removed since initial installation, the general manager may record a notice of violation with the office of the county recorder. The owners of the property as revealed by the assessment roll on which the violation is situated and any other person responsible for the violation shall be notified of the recordation, if their address is known. The owner of record shall have ninety days to take corrective action. Failure to take corrective action within ninety days shall constitute a violation of this code. The general manager shall cause a notice of correction to be recorded at such time as the property owner has established full compliance with the provisions of this chapter. (Ord. 316 §2 (part), 1991).

13.03.090 Cost of enforcement. Any person, firm or corporation or upon whose property a notice of violation has been recorded shall, if the condition creating the nuisance or constituting the violation is not corrected within thirty days, be liable for the cost of abatement and cost of correction which shall include, but not be limited to, cost of investigation, court costs, attorney fees and costs of monitoring compliance. (Ord. 316 §2 (part), 1991).

13.03.100 Chapter controlling. The provisions of this chapter shall prevail and control in the event of any inconsistency between this chapter and any other rule, regulation, ordinance or code of this district. (Ord. 316 §2 (part), 1991).

13.03.110 Remedies/cumulative. The remedies available to the district to enforce this chapter are in addition to any other remedies available under the district's rules and regulations, or any other state statutes or regulations, and do not replace or supplant any other remedy, but are cumulative. (Ord. 316 §2 (part), 1991).

13.03.120 Flow restrictors. In addition to the penalties provided for in Section 13.03.070 of this chapter, district may install a flow restrictor in the service of a customer who violates the provisions of this chapter if, after receiving notice from district that he is in violation, he does not rectify the violation within a reasonable time specified by the district not to exceed sixty days. (Ord. 316 §2 (part), 1991).



APPENDIX I

Report to California Urban Water Conservation Council



MMWD MEMORANDUM

DATE: May 26, 2011
TO: Paul Helliker
FROM: Dan Carney
SUBJECT: 2010 UWMP Demand Management Measures Self-Certification

Pursuant to California Water Code Division 6, Part 2.6, Section 10631(j)¹, Senate Bill No. 7 (SBx7-7)², and the California Department of Water Resource's *Guidebook to Assist Urban Water Suppliers to Prepare a 2010 Urban Water Management Plan (UWMP)*, Part II, Section (E-5)³, the MMWD, an original signatory to the California Urban Water Conservation Council's Memorandum of Understanding (CUWCC/MOU), has elected to comply with the UWMP Demand Management Measure's by self-certifying full compliance with the CUWCC/MOU reporting requirements.

MMWD has selected the gallons per capita per day (GPCD) compliance option. This option requires MMWD to submit detailed reports covering a subset of its conservation program activities, known as Foundational Best Management Practices, as well as calculations of the separate GPCD targets specified in the CUWCC/MOU, and SBx7-7 Method 3. These completed reports and calculations are included as attachments.

This self-certification memo is provided in advance of the CUWCC's independent certification of compliance, in order to facilitate timely adoption of MMWD's 2010 UWMP by July 1, 2011, as required by SBx7-7. Although MMWD submitted the required documents to the CUWCC on May 18, 2011, CUWCC staff stated they may not be able to complete their review and certification process in time for the MMWD Board to adopt the 2010 UWMP by July 1.

Table 1 contains the GPCD targets and results, demonstrating that MMWD is in full compliance with the CUWCC/MOU and SBx7-7 requirements.

Table 1
CUWCC MOU GPCD Compliance Data

Requirement	Baseline Period	GPCD Baseline	GPCD Target	Actual MMWD GPCD in 2010	MMWD meets GPCD Target?
CUWCC/MOU	10-year baseline (1997 to 2006)	145.6	For 2010 = 140.3	119.3	YES

¹ (http://www.water.ca.gov/urbanwatermanagement/docs/water_code-10610-10656.pdf)

² (http://www.water.ca.gov/urbanwatermanagement/docs/sbx7_7_2009.pdf)

³ (http://www.water.ca.gov/urbanwatermanagement/docs/2010FinalUWMPGuidebook_linked.pdf)

Attachments: CUWCC/MOU Foundational BMP reporting forms
CUWCC & SBx7-7 GPCD Targets/Compliance Spreadsheet

The fields in red are required.



Agency name:

Reporting unit name
(District name)

Reporting unit number:

Primary contact:

First name:

Last name:

Email:

You must enter the reporting unit number that we have on record for your agency. Click here to open a table to obtain this number.

Base Year Data

[Link to FAQs](#)

Reporting Unit Base Year

Base Year

What is your reporting period?

BMP 1.3 Metering

Number of unmetered accounts in Base Year

BMP 3.1 & BMP 3.2 & BMP 3.3 Residential Programs

Number of Single Family Customers in Base Year

Number of Multi Family Units in Base Year

BMP 3.4 WaterSense Specification (WSS) Toilets

Number of Single Family Housing Units constructed prior to 1992

Number of Multi Family Units prior to 1992

Average number of toilets per single family household

Average number of toilets per multi family household

Five year average resale rate of single family households

Five-year average resale rate of multi family households

Average number of persons per single family household

Average number of persons per multi family household

BMP 4.0 & BMP 5.0 CII & Landscape

Total water use (in Acre Feet) by CII accounts

Number of accounts with dedicated irrigation meters

Number of CII accounts without meters or with Mixed Use Meters

Number of CII accounts

Resale Rates of 3% equals estimated fixture Replacement Rates

Comments:

[illegible]

Agency name:

Primary contact:

First name: |

Daniel



Marin Municipal Water District

Last name:

Carney

Reporting unit number: 158

Email:

dcarney@marinwater.org

Non-Potable Billed

[illegible]

Non-Potable Un-Billed

[illegible]

The fields in red are required.



Agency name:

Reporting unit name
(District name)

Reporting unit number:

Primary contact:

First name:

Last name:

Email:

You must enter the reporting unit number that we have on record for your agency. Click here to open a table to obtain this number.

[Link to FAQs](#)

[See the complete MOU:](#) [View MOU](#)

[See the coverage requirements for this BMP:](#)

Conservation Coordinator

Conservation Coordinator ☒ Yes ☐ No

Contact Information

First Name

Last Name

Title

Phone

Email

Note that the contact information may be the same as the primary contact information at the top of the page. If this is your case, excuse the inconvenience but please enter the information again.

Water Waste Prevention

Water Agency shall do one or more of the following:

- Enact and enforce an ordinance or establish terms of service that prohibit water waste
- Enact and enforce an ordinance or establish terms of service for water efficient design in new development
- Support legislation or regulations that prohibit water waste
- Enact an ordinance or establish terms of service to facilitate implementation of water shortage response measures
- Support local ordinances that prohibit water waste
- Support local ordinances that establish permits requirements for water efficient design in new

To document this BMP, provide the following:

- A description of, or electronic link to, any ordinances or terms of service
- A description of, or electronic link to, any ordinances or requirements adopted by local jurisdictions or regulatory agencies with the water agency's service area.
- A description of any water agency efforts to cooperate with other entities in the adoption or enforcement of local requirement
- description of agency support positions with respect to adoption of legislation or regulations

You can show your documentation by providing files, links (web addresses), and/or entering a description.

File name(s): Email files to natalie@cuwcc.org

Web address(s) URL: comma-separated list

Enter a description:

2009

BMP 1.1 Operations Practices

Comments:

The fields in red are required.



Agency name:
Reporting unit name
(District name)
Reporting unit number:

Primary contact:

First name:
Last name:
Email:

You must enter the reporting unit number that we have on record for your agency. Click here to open a table to obtain this number.

[Link to FAQs](#)

[View MOU](#)

2009 BMP 1.2 Water Loss Control

Did your agency complete a pre-screening system audit in 2009? Yes ☐ No ☒

If yes, answer the following:

Determine metered sales in AF:

Definition: other accountable uses not included in metered sales, such as unbilled water use, fire suppression, etc.

→ Determine system verifiable uses AF:

Determine total supply into the system in AF:

Does your agency keep necessary data on file to verify the answers above? Yes ☐ No ☐

Did your agency complete a full-scale system water audit during 2009? Yes ☐ No ☒

Does your agency maintain in-house records of audit results or the completed AWWA worksheet for the completed audit which could be forwarded to CUWCC? Yes ☐ No ☒

Did your agency operate a system leak detection program? Yes ☒ No ☐

Comments:

The fields in red are required.

Primary contact:

You must enter the reporting unit number that we have on record for your agency. Click here to open a table to obtain this number.

Agency name:

First name:

Reporting unit name
(District name)

Last name:

Reporting unit number:

Email:



BMP 1.3 Metering with Commodity

[Link to FAQs](#)

[See the complete MOU: View MOU](#)

[See the coverage requirements for this BMP:](#)

Implementation

Does your agency have any unmetered service connections?

☐ Yes ☒ No

If YES, has your agency completed a meter retrofit plan?

☐ Yes ☐ No

Enter the number of previously unmetered accounts fitted with meters during reporting year:

Are all new service connections being metered?

☒ Yes ☐ No

Are all new service connections being billed volumetrically?

☒ Yes ☐ No

Has your agency completed and submitted electronically to the Council a written plan, policy or program to test, repair and replace meters?

☒ Yes ☐ No

Please Fill Out The Following Matrix

Account Type	# Metered Accounts	# Metered Accounts Read	# Metered Accounts Billed by Volume	Billing Frequency Per Year	# of estimated bills/yr
Single-Family	<input type="text" value="50,445"/>	<input type="text" value="50,445"/>	<input type="text" value="50,445"/>	<input type="text" value="Bi-monthly"/>	<input type="text" value="6"/>
Multi-Family	<input type="text" value="4,491"/>	<input type="text" value="4,491"/>	<input type="text" value="4,491"/>	<input type="text" value="Bi-monthly"/>	<input type="text" value="6"/>
Commercial	<input type="text" value="3,243"/>	<input type="text" value="3,243"/>	<input type="text" value="3,243"/>	<input type="text" value="Bi-monthly"/>	<input type="text" value="6"/>
Dedicated Irrigation	<input type="text" value="800"/>	<input type="text" value="800"/>	<input type="text" value="800"/>	<input type="text" value="Bi-monthly"/>	<input type="text" value="6"/>
Institutional	<input type="text" value="226"/>	<input type="text" value="226"/>	<input type="text" value="226"/>	<input type="text" value="Bi-monthly"/>	<input type="text" value="6"/>
Other	<input type="text" value="2"/>	<input type="text" value="2"/>	<input type="text" value="2"/>	<input type="text" value="Monthly"/>	<input type="text" value="12"/>
Industrial	<input type="text" value="179"/>	<input type="text" value="179"/>	<input type="text" value="179"/>	<input type="text" value="Bi-monthly"/>	<input type="text" value="6"/>
Other	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text" value="Other"/>	<input type="text"/>
Other	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text" value="Other"/>	<input type="text"/>
Other	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text" value="Other"/>	<input type="text"/>

Number of CII Accounts with Mixed-use Meters

Number of CII Accounts with Mixed-use Meters Retrofitted with Dedicated Irrigation Meters during Reporting Period

Feasibility Study

Has your agency conducted a feasibility study to assess the merits of a program to provide incentives to switch mixed-use accounts to dedicated landscape meters? ☐ Yes ☒ No

If YES, please fill in the following information:

A. When was the Feasibility Study conducted

B. Email or provide a link to the feasibility study (or description of):

File name(s): Email files to natalie@cuwcc.org

Web address(s) URL: comma-separated list

General Comments about BMP 1.3:

Other = Raw Water accounts Industrial = Recycled Water

The fields in red are required.

Primary contact:

Agency name: Marin Municipal Water District

First name: Daniel

Reporting unit name

(District name) Marin Municipal Water District

Last name: Carney

Reporting unit number: 158

Email: dcarney@marinwater.org

You must enter the reporting unit number that we have on record for your agency. Click here to open a table to obtain this number.



2009

BMP 1.4 Retail Conservation Pricing

[Link to FAQs](#)

[View MOU](#)

If you are reporting more rate structures than this form allows, add the structures to a spreadsheet and send the file to natalie@cuwcc.org.

Implementation (Water Rate Structure)

Enter the Water Rate Structures that are assigned to the majority of your customers, by customer class

Rate Structure	Customer Class	Total Revenue	Commodity Charges	Total Revenue Customer Meter/Service (Fixed Charges)
Increasing Block	Single-Family	27,249,514.35		8,173,977.33
Increasing Block	Multi-Family	5,359,736.63		
Increasing Block	Commercial	4,788,482.58		
Increasing Block	Industrial	394,183.92		
Increasing Block Se	Institutional	2,471,034.66		
Increasing Block Se	Dedicated Irrigation	3,024,796.54		
Increasing Block	Other	525,311.22		

Implementation Option (Conservation Pricing Option)

- ☒ Use Annual Revenue As Reported
☐ Use Canadian Water & Wastewater Association Rate Design Model

If CWWA is select, enter the file name and email the spreadsheet to natalie@cuwcc.org

Retail Waste Water (Sewer) Rate Structure by Customer Class

Agency Provide Sewer Service

☐ Yes ☒ No

Select the Retail Waste Water(Sewer) Rate Structure assigned to the majority of your customers within a specific customer class.

Rate Structure	Customer Class	Total Revenue	Commodity Charges	Total Revenue Customer Meter/Service (Fixed Charges)
Select a Rate Struc	Other			
Select a Rate Struc	Other			
Select a Rate Struc	Other			
Select a Rate Struc	Other			
Select a Rate Struc	Other			
Select a Rate Struc	Other			
Select a Rate Struc	Other			

Comments:

Meter/Fixed Charges shown as annual total. MMWD does not track these charges by



The fields in red are required.

Agency name:

Reporting unit name
(District name)

Reporting unit number:

Primary contact:

First name:

Last name:

Email:

Click here to open a table that displays your agency name reporting unit name and reporting unit number. Please ensure that you enter the correct information.



[Link to FAQs](#)

[View MOU](#)

2009

BMP 2.1 Public Outreach - Retail Reporting

Is a Wholesale Agency Performing Public Outreach?

Are there one or more wholesale agencies performing public outreach which can be counted to help your agency comply with the BMP?

☐ Yes ☒ No

Enter the name(s) of the wholesale agency (comma delimited)

Is your agency performing public outreach?

Report a minimum of 4 water conservation related contacts your agency had with the public during the year.

Public Information Programs List

Did at least one contact take place during each quarter of the reporting year? ☒

Number of Public Contacts	Public Information Programs
<input type="text" value="10"/>	<input type="text" value="Newsletter articles on conservation"/>
<input type="text" value="215,000"/>	<input type="text" value="Flyers and/or brochures (total copies), bill stuffers, messages printed on bill, information packets"/>
<input type="text" value="61"/>	<input type="text" value="Email Messages"/>
<input type="text" value="2,511"/>	<input type="text" value="General water conservation information"/>
<input type="text"/>	<input type="text" value="Select a public contact"/>

Contact with the Media

Are there one or more wholesale agencies performing media outreach which can be counted to help your agency comply with the BMP?

☐ Yes ☒ No

Enter the name(s) of the wholesale agency (comma delimited)

OR Retail Agency (Contacts with the Media)

Did at least one contact take place during each quarter of the reporting year? ☒

Media Contacts List

Number of Media Contacts	Did at least one contact take place during each quarter of the reporting year?	Media Contact Types
<input type="text" value="16"/>	<input type="text"/>	<input type="text" value="News releases"/>
<input type="text" value="66"/>	<input type="text"/>	<input type="text" value="Articles or stories resulting from outreach"/>
<input type="text" value="12"/>	<input type="text"/>	<input type="text" value="Newspaper contacts"/>
<input type="text"/>	<input type="text"/>	<input type="text" value="Select a type of media contact"/>
<input type="text"/>	<input type="text"/>	<input type="text" value="Select a type of media contact"/>
<input type="text"/>	<input type="text"/>	<input type="text" value="Select a type of media contact"/>

Is a Wholesale Agency Performing Website Updates?

Did one or more CUWCC wholesale agencies agree to assume your agency's responsibility for meeting the requirements of and for CUWCC reporting of this BMP?

☐ Yes ☒ No

Enter the name(s) of the wholesale agency (comma delimited)

Is Your Agency Performing Website Updates?

Enter your agency's URL (website address):

www.marinwater.org

Describe a minimum of four water conservation related updates to your agency's website that took place during the year:

1. Smart irrigation controller rebate program featured on homepage & new page created.
2. HET rebate program page updated with new program info and HET resources.
3. New page created for Bay-Friendly Garden Registration program.
4. Watering schedule updated weekly during irrigation season.

Did at least one Website Update take place during each quarter of the reporting year? ☒ Yes ☐ No

Public Outreach Annual Budget

Enter budget for public outreach programs. You may enter total budget in a single line or break the budget into discrete categories by entering many rows. Please indicate if personnel costs are included in the entry.

Category	Amount	Personnel Costs Included? If yes, check the box.	Comments
Conservation P	\$441,400	<input checked="" type="checkbox"/>	
		<input type="checkbox"/>	
		<input type="checkbox"/>	
		<input type="checkbox"/>	
		<input type="checkbox"/>	
		<input type="checkbox"/>	
		<input type="checkbox"/>	

Comments:

"General Water Conservation Information" includes: Public Events: 5 events, 400 participants; Public Presentations: 6 presentations, 100 participants; Customer F

The fields in red are required.



Agency name:

Reporting unit name
(District name)

Reporting unit number:

Primary contact:

First name:

Last name:

Email:

Click here to open a table that displays your agency name reporting unit name and reporting unit number. Please ensure that you enter the correct information.

[Link to FAQs](#)

2009

BMP 2.1 Public Outreach Cont'd

[View MOU](#)

Public Outreach Expenses

Enter expenses for public outreach programs. Please include the same kind of expenses you included in the question related to your budget (Section 2.1.7, above). For example, if you included personnel costs in the budget entered above, be sure to include them here as well.

Expense Category	Expense Amount	Personnel Costs Included?	
	\$441,400.00	<input checked="" type="checkbox"/>	If yes, check the check box.
		<input type="checkbox"/>	
		<input type="checkbox"/>	
		<input type="checkbox"/>	

Additional Public Information Program

Please report additional public information contacts. List these additional contacts in order of how your agency views their importance / effectiveness with respect to conserving water, with the most important/ effective listed first (where 1 = most important).

Were there additional Public Outreach efforts?

☐ Yes ☒ No

Public Outreach Additional Information

Public Information Programs	Importance	

Social Marketing Programs

Branding

Does your agency have a water conservation "brand," "theme" or mascot? ☐ Yes ☒ No

Describe the brand, theme or mascot.

"Think blue. Go green" and "Conserving water together" logos

Market Research

Have you sponsored or participated in market research to refine your message? ☐ Yes ☒ No

Market Research Topic

Brand Message

Brand Mission Statement

Community Committees

Do you have a community conservation committee?

☒ Yes ☐ No

Enter the names of the community committees:

Conservation Action Committee

Training

Training Type	# of Trainings	# of Attendees	Description of Other
Professional and Res ⁺	\$25	\$371	

Social Marketing Expenditures

Public Outreach Social Marketing Expenses

Expense Category	Expense Amount	Description

Partnering Programs - Partners

Name

Type of Program

☒ CLCA? Coordinated professional training, participated in panel discussions and presentations.

☒ Green Building Programs? Participated with the County of Marin as advisors to update Green Building Codes.

☒ Master Gardeners? Bay-Friendly Garden Walks

☒ Cooperative Extension? Participated with U.C. Cooperative Extension as advisors on a study of water savings at residential survey sites.

☒ Local Colleges? Coordinate with College of Marin to deliver professional and residential landscape training, participate as advisors on a curriculum development⁺

☒ Other? Implemented pilot projects with local non-profit organizations (Sustainable Fairfax and Salmon Protection and Watershed Network) to explore ris⁺

☐ Retail and wholesale outlet; name(s) and type(s) of programs:

--	--

Partnering Programs - Newsletters

Number of newsletters per year

--

Number of customers per year

Partnering with Other Utilities

Describe other utilities your agency partners with, including electrical utilities

Coordinated with PG&E on the High-Efficiency Clothes Washer public outreach program.

Conservation Gardens

Describe water conservation gardens at your agency or other high traffic areas or new

"Water Conservation Garden" at MMWD's main offices with native & Mediterranean adapted plants.

Landscape contests or awards

Describe water wise landscape contest or awards program conducted by your agency

Bay-Friendly Garden Registration program certifies gardens that meet certain criteria. Registered gardens display an aluminum garden sign and serve as neighborhood models of environmentally friendly gardening practices.

Comments:

The fields in red are required.



Agency name:
Reporting unit name
(District name)
Reporting unit number:

Primary contact:

First name:
Last name:
Email:

Click here to open a table that displays your agency name reporting unit name and reporting unit number. Please ensure that you enter the correct information.

[Link to FAQs](#)

[View MOU](#)

BMP 2.2 School Education Programs, Retail Agencies

School Programs

Is your agency implementing school programs which can be counted to help another agency comply with this BMP?

☐ Yes ☒ No

Enter Wholesaler Names, separated by commas:

NA

☐ Materials meet state education framework requirements?

Description of Materials

NA

☐ Materials distributed to K-6 Students?

Description of materials distributed to K-6 Students

NA

Number of students reached

☐ Materials distributed to 7-12 Students?

Description of materials distributed to 7-12 Students

NA

Number of Distribution

Annual budget for school education program

Description of all other water supplier education programs

Teacher workshop, field trips, school garden grants, assemblies.

School Program Activities

Classroom presentations:

Number of presentations

19

Number of attendees

414

Large group assemblies:

Number of presentations

10

Number of attendees

2967

Children's water festivals or other events:

Number of presentations

NA

Number of attendees

NA

Cooperative efforts with existing science/water education programs (various workshops, science fair awards or judging) and follow-up:

Number of presentations

NA

Number of attendees

NA

Other methods of disseminating information (i.e. themed age-appropriate classroom loaner kits):

Description	<div>NA</div>		
Number distributed	<div>NA</div>		
Staffing children's booths at events & festivals:			
Number of booths	<div>5</div>	Number of attendees	<div>1,450</div>
Water conservation contests such as poster and photo:			
Description	<div>NA</div>		
Number distributed	<div>NA</div>		
Offer monetary awards/funding or scholarships to students:			
Number Offered	<div>5 garden grants</div>	Total Funding	<div>\$8,215</div>
Teacher training workshops:			
Number of presentations	<div>NA</div>	Number of attendees	<div>NA</div>
Fund and/or staff student field trips to treatment facilities, recycling facilities, water conservation gardens, etc.:			
Number of tours or field trips	<div>NA</div>	Number of participants	<div>NA</div>
College internships in water conservation offered:			
Number of internships	<div>NA</div>	Total funding	<div>NA</div>
Career fairs/workshops:			
Number of presentations	<div>NA</div>	Number of attendees	<div>NA</div>
Additional program(s) supported by agency but not mentioned above:			
Description	<div>MMWD provided support in the form of information, handouts, and prizes at 2 additional events for students.</div>		
Number of events (if applicable)	<div>2</div>	Number of participants	<div>30</div>
Total reporting period budget expenditures for school education programs (include all agency costs):			<div>\$41,191</div>

Comments

[illegible]

[illegible]

Agency name:
 Division name (Reporting unit):
 Reporting unit number:
 Primary contact:
 Email:



WATER SOURCES

[illegible][illegible][illegible]

2010

[illegible]

The fields in red are required.



Agency name:

Reporting unit name
(District name)

Reporting unit number:

Primary contact:

First name:

Last name:

Email:

You must enter the reporting unit number that we have on record for your agency. Click here to open a table to obtain this number.

[Link to FAQs](#)

[See the complete MOU:](#) [View MOU](#)

[See the coverage requirements for this BMP:](#)

Conservation Coordinator

Conservation Coordinator ☒ Yes ☐ No

Contact Information

First Name

Last Name

Title

Phone

Email

Note that the contact information may be the same as the primary contact information at the top of the page. If this is your case, excuse the inconvenience but please enter the information again.

Water Waste Prevention

Water Agency shall do one or more of the following:

- Enact and enforce an ordinance or establish terms of service that prohibit water waste
- Enact and enforce an ordinance or establish terms of service for water efficient design in new development
- Support legislation or regulations that prohibit water waste
- Enact an ordinance or establish terms of service to facilitate implementation of water shortage response measures
- Support local ordinances that prohibit water waste
- Support local ordinances that establish permits requirements for water efficient design in new

To document this BMP, provide the following:

- A description of, or electronic link to, any ordinances or terms of service
- A description of, or electronic link to, any ordinances or requirements adopted by local jurisdictions or regulatory agencies with the water agency's service area.
- A description of any water agency efforts to cooperate with other entities in the adoption or enforcement of local requirement
- description of agency support positions with respect to adoption of legislation or regulations

You can show your documentation by providing files, links (web addresses), and/or entering a description.

File name(s): Email files to natalie@cuwcc.org

Web address(s) URL: comma-separated list

Enter a description:

(a) MMWD conservation code - see section 13.02.020 for water waste requirements
(b) City of San Rafael, Municipal Code Section 14.16.370: <http://library.municode.com/index.aspx?clientId=16610&stateId=5&stateName=California>

2010

BMP 1.1 Operations Practices

Comments:

The fields in red are required.



Agency name: Marin Municipal Water District

Reporting unit name
(District name) Marin Municipal Water District

Reporting unit number: 158

Primary contact:

First name: Daniel

Last name: Carney

Email: dcarney@marinwater.org

You must enter the reporting unit number that we have on record for your agency. Click here to open a table to obtain this number.

[Link to FAQs](#)

2010

BMP 1.2 Water Loss Control

[View MOU](#)

AWWA Water Audit

Agency to complete a Water Audit & Balance Using The AWWA Software ☐ Yes ☒ No
Email to natalie@cuwcc.org - Worksheets (AWWA Water Audit). Enter the name of the file below:

Water Audit Validity Score
from AWWA spreadsheet

Agency Completed Training In The AWWA Water Audit Method ☐ Yes ☒ No

Agency Completed Training In The Component Analysis Process ☐ Yes ☒ No

Completed/Updated the Component Analysis (at least every 4 years)? ☐ Yes ☒ No

Component Analysis Completed/Updated Date

Water Loss Performance

Agency Repaired All Reported Leaks & Breaks To The Extent Cost Effective ☒ Yes ☐ No

Recording Keeping Requirements:

Date/Time Leak Reported	Leak Location
Type of Leaking Pipe Segment or Fitting	Leak Running Time From Report to Repair
Leak Volume Estimate	Cost of Repair

Agency Located and Repaired Unreported Leaks to the Extent Cost Effective ☒ Yes ☐ No

Type of Program Activities Used to Detect Unreported Leaks

The MMWD has a Leak Detection Team. The Leak Detection Team spent approximately 1500 hours in this effort in 2010. The team uses sub-surface amplification equipment to detect and locate leakage.

Annual Summary Information

Complete the following table with annual summary information (required for reporting years 2-5 only)

Total Leaks Repaired	Economic Value Of Real Loss	Economic Value Of Apparent Loss	Miles Of System Surveyed For Leaks	Pressure Reduction Undertaken for loss reduction	Cost Of Interventions	Water Saved (AF/Year)
399		\$325,000.00	222		\$200,000.00	220.00

Comments:

Economic Value estimated @\$3.39/ccf (Tier 1)
Water Saved estimated at 197,000 gal/day x 365 days

The fields in red are required.

Primary contact:

You must enter the reporting unit number that we have on record for your agency. Click here to open a table to obtain this number.

Agency name: Marin Municipal Water District

First name: Daniel

Reporting unit name

(District name) Marin Municipal Water District

Last name: Carney

Reporting unit number: 158

Email: dcarney@marinwater.org



BMP 1.3 Metering with Commodity 2010

[Link to FAQs](#)

[See the complete MOU: View MOU](#)

[See the coverage requirements for this BMP:](#)

Implementation

Does your agency have any unmetered service connections?

☐ Yes ☒ No

If YES, has your agency completed a meter retrofit plan?

☐ Yes ☒ No

Enter the number of previously unmetered accounts fitted with meters during reporting year:

0

Are all new service connections being metered?

☒ Yes ☐ No

Are all new service connections being billed volumetrically?

☒ Yes ☐ No

Has your agency completed and submitted electronically to the Council a written plan, policy or program to test, repair and replace meters?

☒ Yes ☐ No

Please Fill Out The Following Matrix

Account Type	# Metered Accounts	# Metered Accounts Read	# Metered Accounts Billed by Volume	Billing Frequency Per Year	# of estimated bills/yr
Single-Family	50,479	50,479	50,479	Bi-monthly	6
Multi-Family	4,496	4,496	4,496	Bi-monthly	6
Commercial	3,249	3,249	3,249	Bi-monthly	6
Dedicated Irrigation	800	800	800	Bi-monthly	6
Institutional	227	227	227	Bi-monthly	6
Other	2	2	2	Monthly	12
Industrial	184	184	184	Bi-monthly	6
Other				Other	
Other				Other	
Other				Other	

Number of CII Accounts with Mixed-use Meters 3,476

Number of CII Accounts with Mixed-use Meters Retrofitted with Dedicated Irrigation Meters during Reporting Period 0

Feasibility Study

Has your agency conducted a feasibility study to assess the merits of a program to provide incentives to switch mixed-use accounts to dedicated landscape meters? ☐ Yes ☒ No

If YES, please fill in the following information:

A. When was the Feasibility Study conducted

B. Describe, upload or provide an electronic link to the Feasibility Study Upload File

File name(s): Email files to natalie@cuwcc.org

Web address(s) URL: comma-separated list

Comments:

Other = Raw Water accounts Industrial = Recycled Water

The fields in red are required.

Primary contact:

You must enter the reporting unit number that we have on record for your agency. Click here to open a table to obtain this number.

Agency name: Marin Municipal Water District

First name: Daniel

Reporting unit name

(District name) Marin Municipal Water District

Last name: Carney

Reporting unit number: 158

Email: dcarney@marinwater.org



2010

BMP 1.4 Retail Conservation Pricing

[Link to FAQs](#)

[View MOU](#)

If you are reporting more rate structures than this form allows, add the structures to a spreadsheet and send the file to natalie@cuwcc.org.

Implementation (Water Rate Structure)

Enter the Water Rate Structures that are assigned to the majority of your customers, by customer class

Rate Structure	Customer Class	Total Revenue	Commodity Charges	Total Revenue Customer Meter/Service (Fixed Charges)
Increasing Block	Single-Family	26,210,046.03		8,553,515.11
Increasing Block	Multi-Family	5,496,586.30		
Increasing Block	Commercial	4,922,792.68		
Increasing Block	Industrial	336,425.53		
Increasing Block	Institutional	2,553,503.56		
Increasing Block	Dedicated Irrigation	2,489,769.65		
Increasing Block	Other	483,809.49		

Implementation Option (Conservation Pricing Option)

- ☒ Use Annual Revenue As Reported
☐ Use Canadian Water & Wastewater Association Rate Design Model

If CWWA is select, enter the file name and email the spreadsheet to natalie@cuwcc.org

Retail Waste Water (Sewer) Rate Structure by Customer Class

Agency Provide Sewer Service

☐ Yes ☒ No

Select the Retail Waste Water(Sewer) Rate Structure assigned to the majority of your customers within a specific customer class.

Rate Structure	Customer Class	Total Revenue	Commodity Charges	Total Revenue Customer Meter/Service (Fixed Charges)
Select a Rate Struc	Other			
Select a Rate Struc	Other			
Select a Rate Struc	Other			
Select a Rate Struc	Other			
Select a Rate Struc	Other			
Select a Rate Struc	Other			
Select a Rate Struc	Other			

Comments:

Meter/Fixed Charges are shown as annual total. MMWD does not track these c



The fields in red are required.

Agency name:

Reporting unit name
(District name)

Reporting unit number:

Primary contact:

First name:

Last name:

Email:

Click here to open a table that displays your agency name reporting unit name and reporting unit number. Please ensure that you enter the correct information.



[Link to FAQs](#)

[View MOU](#)

2010

BMP 2.1 Public Outreach - Retail Reporting

Is a Wholesale Agency Performing Public Outreach?

Are there one or more wholesale agencies performing public outreach which can be counted to help your agency comply with the BMP?

☐ Yes ☒ No

Enter the name(s) of the wholesale agency (comma delimited)

Is your agency performing public outreach?

Report a minimum of 4 water conservation related contacts your agency had with the public during the year.

Public Information Programs List

Did at least one contact take place during each quarter of the reporting year? ☒

Number of Public Contacts	Public Information Programs
<input type="text" value="10"/>	<input type="text" value="Newsletter articles on conservation"/>
<input type="text" value="132,500"/>	<input type="text" value="Flyers and/or brochures (total copies), bill stuffers, messages printed on bill, information packets"/>
<input type="text" value="64"/>	<input type="text" value="Email Messages"/>
<input type="text" value="5,025"/>	<input type="text" value="General water conservation information"/>
<input type="text"/>	<input type="text" value="Select a public contact"/>

Contact with the Media

Are there one or more wholesale agencies performing media outreach which can be counted to help your agency comply with the BMP?

☐ Yes ☒ No

Enter the name(s) of the wholesale agency (comma delimited)

OR Retail Agency (Contacts with the Media)

Did at least one contact take place during each quarter of the reporting year? ☒

Media Contacts List

Number of Media Contacts	Did at least one contact take place during each quarter of the reporting year?	Media Contact Types
<input type="text" value="14"/>	<input type="text"/>	<input type="text" value="News releases"/>
<input type="text" value="84"/>	<input type="text"/>	<input type="text" value="Articles or stories resulting from outreach"/>
<input type="text" value="12"/>	<input type="text"/>	<input type="text" value="Newspaper contacts"/>
<input type="text"/>	<input type="text"/>	<input type="text" value="Select a type of media contact"/>
<input type="text"/>	<input type="text"/>	<input type="text" value="Select a type of media contact"/>
<input type="text"/>	<input type="text"/>	<input type="text" value="Select a type of media contact"/>

Is a Wholesale Agency Performing Website Updates?

Did one or more CUWCC wholesale agencies agree to assume your agency's responsibility for meeting the requirements of and for CUWCC reporting of this BMP?

☐ Yes ☒ No

Enter the name(s) of the wholesale agency (comma delimited)

Is Your Agency Performing Website Updates?

Enter your agency's URL (website address):

www.marinwater.org

Describe a minimum of four water conservation related updates to your agency's website that took place during the year:

1. Conservation section of website fully updated.
2. New page created for "Save Your Green, Save Our Blue" coupon program.
3. New page created for "Do-It-Yourself Home Water Survey."
4. Calendar for conservation and other events added.
5. "Summer Water Savings" resources featured on homepage.
6. Watering schedule updated weekly during irrigation season.

Did at least one Website Update take place during each quarter of the reporting year?

☒ Yes ☐ No

Public Outreach Annual Budget

Enter budget for public outreach programs. You may enter total budget in a single line or break the budget into discrete categories by entering many rows. Please indicate if personnel costs are included in the entry.

Category	Amount		Personnel Costs Included? If yes, check the box.	Comments
Conservation P	\$222,503		<input checked="" type="checkbox"/>	
			<input type="checkbox"/>	
			<input type="checkbox"/>	
			<input type="checkbox"/>	
			<input type="checkbox"/>	
			<input type="checkbox"/>	
			<input type="checkbox"/>	

Comments:

"General Water Conservation Information" includes: Public Events: 6 events, 820 participants; Public Presentations: 19 presentations, 265 participants; Customer

The fields in red are required.



Agency name: Marin Municipal Water District

Reporting unit name
(District name) Marin Municipal Water District

Reporting unit number: 158

Primary contact:

First name: Daniel

Last name: Carney

Email: dcarney@marinwater.org

Click here to open a table that displays your agency name reporting unit name and reporting unit number. Please ensure that you enter the correct information.

[Link to FAQs](#)

2010

BMP 2.1 Public Outreach Cont'd

[View MOU](#)

Public Outreach Expenses

Enter expenses for public outreach programs. Please include the same kind of expenses you included in the question related to your budget (Section 2.1.7, above). For example, if you included personnel costs in the budget entered above, be sure to include them here as well.

Expense Category	Expense Amount	Personnel Costs Included?	
	\$222,503.00	<input checked="" type="checkbox"/>	If yes, check the check box.
		<input type="checkbox"/>	
		<input type="checkbox"/>	
		<input type="checkbox"/>	

Additional Public Information Program

Please report additional public information contacts. List these additional contacts in order of how your agency views their importance / effectiveness with respect to conserving water, with the most important/ effective listed first (where 1 = most important).

Were there additional Public Outreach efforts?

☐ Yes ☒ No

Public Outreach Additional Information

Public Information Programs	Importance	

Social Marketing Programs

Branding

Does your agency have a water conservation "brand," "theme" or mascot? ☐ Yes ☒ No

Describe the brand, theme or mascot.

"Think blue. Go green" and "Conserving water together" logos

Market Research

Have you sponsored or participated in market research to refine your message? ☐ Yes ☒ No

Market Research Topic

Brand Message

Brand Mission Statement

Community Committees

Do you have a community conservation committee?

☒ Yes ☐ No

Enter the names of the community committees:

Conservation Action Committee

Training

Training Type	# of Trainings	# of Attendees	Description of Other
Professional and Res	\$45	\$839	

Social Marketing Expenditures

Public Outreach Social Marketing Expenses

Expense Category	Expense Amount	Description

Partnering Programs - Partners

Name

Type of Program

☒ CLCA?

Coordinated professional training, participated in panel discussions and presentations.

☒ Green Building Programs?

Participated with the County of Marin as advisors to update Green Building Codes.

☒ Master Gardeners?

Bay-Friendly Garden Walks

☒ Cooperative Extension?

Participated with U.C. Cooperative Extension as advisors on a study of water savings at residential survey sites.

☒ Local Colleges?

Coordinate with College of Marin to deliver professional and residential landscape training, participate as advisors on a curriculum development

☒ Other

Implemented pilot projects with local non-profit organizations (Sustainable Fairfax and Salmon Protection and Watershed Network) to explore res

☐ Retail and wholesale outlet; name(s) and type(s) of programs:

--	--

Partnering Programs - Newsletters

Number of newsletters per year

--

Number of customers per year

Partnering with Other Utilities

Describe other utilities your agency partners with, including electrical utilities

Coordinated with PG&E on the High-Efficiency Clothes Washer public outreach program.

Conservation Gardens

Describe water conservation gardens at your agency or other high traffic areas or new

1. "Water Conservation Garden" at MMVWD's main offices with native & Mediterranean adapted plants.
2. Five new public rainwater harvesting demonstration sites installed as part of 10,000 Rain Gardens project in partnership with Salmon Protection and Watershed Network.

Landscape contests or awards

Describe water wise landscape contest or awards program conducted by your agency

Bay-Friendly Garden Registration program certifies gardens that meet certain criteria. Registered gardens display an aluminum garden sign and serve as neighborhood models of environmentally friendly gardening practices.

Comments:

The fields in red are required.



Agency name:
Reporting unit name
(District name)
Reporting unit number:

Primary contact:

First name:
Last name:
Email:

Click here to open a table that displays your agency name reporting unit name and reporting unit number. Please ensure that you enter the correct information.

[Link to FAQs](#)

[View MOU](#)

BMP 2.2 School Education Programs, Retail Agencies

School Programs

Is your agency implementing school programs which can be counted to help another agency comply with this BMP?

☐ Yes ☒ No

Enter Wholesaler Names, separated by commas:

NA

☐ Materials meet state education framework requirements?

Description of Materials

NA

☐ Materials distributed to K-6 Students?

Description of materials distributed to K-6 Students

NA

Number of students reached

☐ Materials distributed to 7-12 Students?

Description of materials distributed to 7-12 Students

NA

Number of Distribution

Annual budget for school education program

Description of all other water supplier education programs

classroom presentations, assemblies, school bus grants

School Program Activities

Classroom presentations:

Number of presentations

28

Number of attendees

1327

Large group assemblies:

Number of presentations

20

Number of attendees

5942

Children's water festivals or other events:

Number of presentations

NA

Number of attendees

NA

Cooperative efforts with existing science/water education programs (various workshops, science fair awards or judging) and follow-up:

Number of presentations

NA

Number of attendees

NA

Other methods of disseminating information (i.e. themed age-appropriate classroom loaner kits):

Description

NA

Number distributed

Staffing children's booths at events & festivals:

Number of booths

1

Number of attendees

90

Water conservation contests such as poster and photo:

Description

NA

Number distributed

NA

Offer monetary awards/funding or scholarships to students:

Number Offered

2 bus grants

Total Funding

\$535

Teacher training workshops:

Number of presentations

NA

Number of attendees

NA

Fund and/or staff student field trips to treatment facilities, recycling facilities, water conservation gardens, etc.:

Number of tours or field trips

17

Number of participants

768

College internships in water conservation offered:

Number of internships

NA

Total funding

NA

Career fairs/workshops:

Number of presentations

1

Number of attendees

20

Additional program(s) supported by agency but not mentioned above:

Description

Hands-on student activities: pump, pass, pour

Number of events (if applicable)

10

Number of participants

122

Total reporting period budget expenditures for school education programs (include all agency costs):

\$32,246

Comments



TARGETS / COMPLIANCE (CUWCC MOU)

Baseline / Initial GPCD

(Use option buttons to select)

GPCD in 2006 ○

139.4
145.6

Baseline GPCD (1997 to 2006) ●

GPCD in 2010

119.3
119.4

GPCD Target for 2018

Biennial GPCD Compliance Table

Year	Report	Target		Highest Acceptable Bound	
		% Base	GPCD	% Base	GPCD
2010	1	96.4%	140.3	100%	145.6
2012	2	92.8%	135.1	96.4%	140.3
2014	3	89.2%	129.9	92.8%	135.1
2016	4	85.6%	124.6	89.2%	129.9
2018	5	82.0%	119.4	82.0%	119.4

Potable Water GPCD for each Year in the

Baseline Period

Year	GPCD
2006	139.4
2005	138.7
2004	148.9
2003	146.2
2002	150.8
2001	153.1
2000	148.5
1999	144.2
1998	137.8
1997	148.1

Monthly GPCD Data for Weather Normalization

Year	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
2010	119.3	119.3	119.3	119.3	119.3	119.3	119.3	119.3	119.3	119.3	119.3	119.3
Baseline avg*	145.6	145.6	145.6	145.6	145.6	145.6	145.6	145.6	145.6	145.6	145.6	145.6

* The average for each month is based on the baseline period 1997 to 2006



TARGETS / COMPLIANCE (SBx7-7)

Target Summary	2020	2015
Method 1	112.1	126.1
Method 2	N/A	N/A
Method 3	124.5	132.3
Method 4	0.0	0.0
Min Value		Max Value

Input cells:
Calculated cells:

GPCD in 2010	119.3
Base daily per capita water use (10-15yr baseline)	140.1
Base daily per capita water use (5yr baseline)	132.7
Max. allowable GPCD target in 2020 (95% x 5yr baseline)	126.1

Method 1: Baseline per Capita Water Use

80% x Base daily per capita water use (10-15yr baseline):	112.1
2015 Target:	126.1
2020 Target:	112.1

Method 2: Performance Standards

TM 2 Indoor Water Use allowance:	0.0
TM 6 Landscaped Area Water Use:	0.0
TM 7 Baseline CII Water Use:	0.0
2015 Target:	N/A
2020 Target:	N/A

Method 3: Hydrologic Region Targets

Enter the percentage of your service area population in each hydrologic region

Region	Region Name	% Population	GPCD Target
1	North Coast		137
2	San Francisco Bay	100.0%	131
3	Central Coast		123
4	South Coast		149
5	Sacramento River		176
6	San Jacinto		174
7	Tulare lake		188
8	North Lahontan		173
9	South Lahontan		170
10	Colorado River	100.0%	211
			2015 Target: 132.3
			2020 Target: 124.5

Method 4:

To be Developed



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